

APPLICATION SOLUTIONS OPPORTUNITIES

WESTERN EUROPE 1991

INPUT



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Applications Solutions Opportunities  
Western Europe, 1991-1996

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## Abstract


This report provides an analysis of the opportunities for software and services firms in the Western European market for application solutions. Specifically this report addresses two delivery modes for application solutions:

- Application Software Products
- Turnkey Systems

The market for application solutions provided via the processing services delivery mode is discussed in a separate INPUT report *Processing Services Markets - Western Europe 1991-1996*. INPUT defines Turnkey Systems as those application solutions which comprise the equipment as well as system software, standard application software and the necessary professional services required for implementing the system.

The report provides market estimates for 1991 and forecasts for 1996 for each of these delivery modes for Western Europe and for the major European country economies. Leading applications solution vendors are identified for each of these countries. The report discusses the key competitive and environmental forces in the European market of the 1990s and the implications of these for vendors.

Profiles of a number of leading applications solutions vendors are included, outlining the approach to the market being taken by these vendors.

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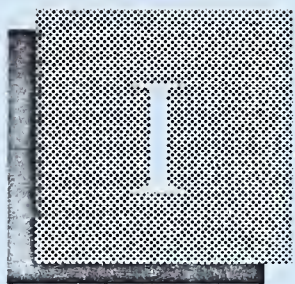
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# Introduction

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## I Introduction

### A Objectives

This report has been produced as part of INPUT's Western European Market Analysis Programme for the computer software and services industry. The report analyses the markets for two delivery modes for applications solutions:

- Applications Software Products
- Turnkey Systems

The primary objectives of this report are to:

- Describe the overall size of the market and its growth potential to 1996
- Analyse the major forces shaping the applications solutions market and the resulting implications for vendors.
- Identify the current competitive structure of the market.

### B Scope

The two service delivery modes covered in this report are classified as business applications solutions as is shown in Exhibit I-1 which shows INPUT's overall structuring of the software and services industry. Processing Services, also classified as a business application solution, is covered by a separate report *Processing Services Markets - Western Europe 1991-1996*.

**INPUT** defines application software products as those products that perform a specific function directly related to solving a business or organisational need. These may be specific to a particular industry or provided to organisations in many different sectors. Software applications products are thus referred to respectively as industry specific or cross industry applications software products.

The turnkey systems delivery mode fundamentally comprises four principal elements combined by the vendor and provided to the user as a complete packaged application solution, these are:

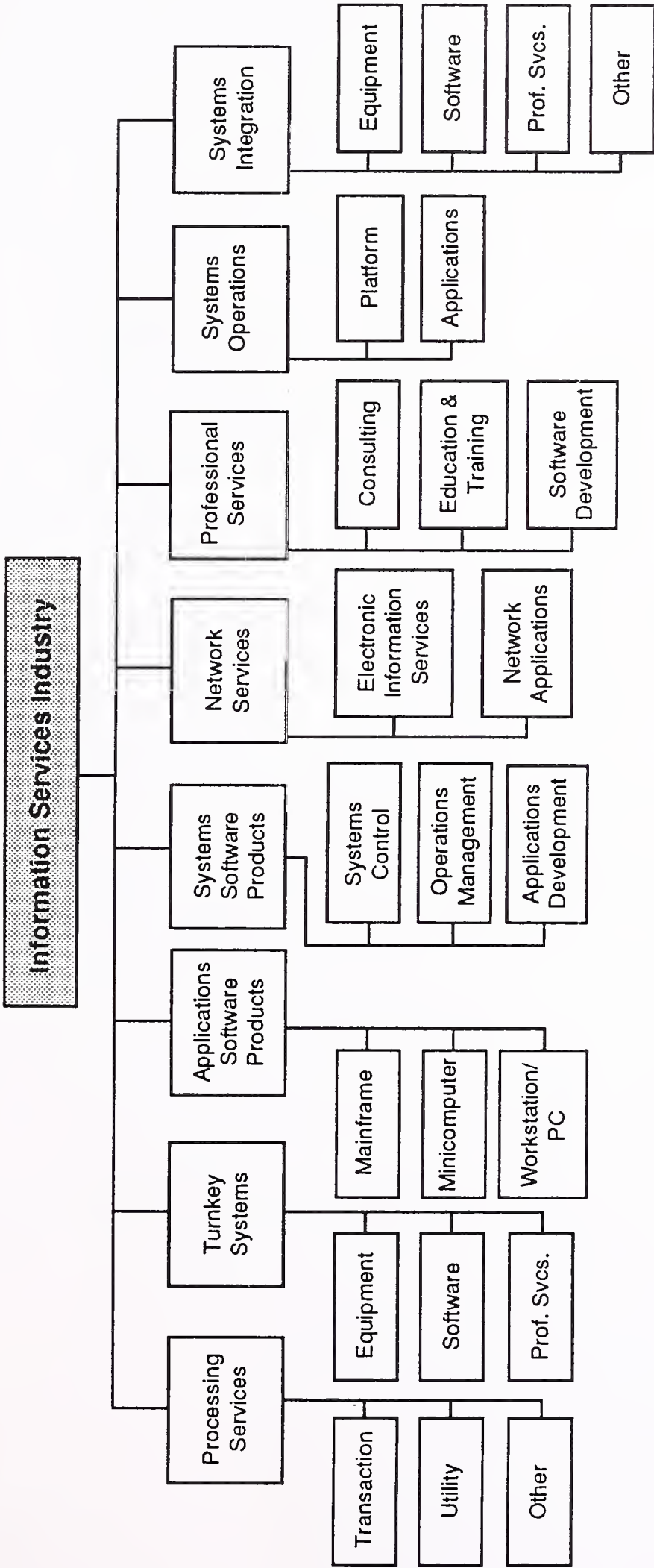
- Information systems equipment
- Systems software products
- Standard applications software products (plus maintenance and support)
- Professional services (elements of customisation of applications software, training, consultancy).

The essential nature of applications software products and turnkey systems is that they provide standard packaged information solutions that require minimal customisation.

The geographic scope of this report is all Western European countries. Market size and forecast data is provided for each individual country with the exception of Greece, Portugal and the Republic of Ireland which are treated as a group for the purpose of analysis. Germany is now considered to cover the two geographic areas previously described as West Germany and East Germany.

Exhibit I-1

Information Services Industry Structure



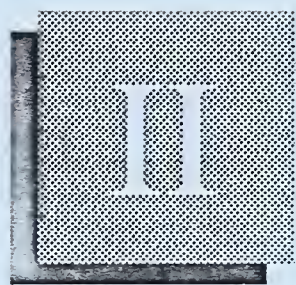
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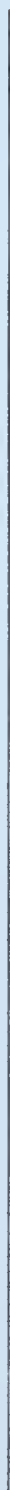
## C Report Structure

The remaining chapters of this report are organised as follows:

- Chapter II contains an executive overview of the key points within the report. It is designed for the reader who wishes to quickly identify the salient messages in the report without the need to read the report in its entirety.
- Chapter III provides a market analysis and forecast for the applications software products and turnkey systems markets for the period 1991-1996.
- Chapter IV provides the detailed market forecast and competitive data for each country market.
- Chapter V discusses the impact of some of the major changes taking place in the industry on application solution vendors.
- Chapter VI provides profiles of a selection of application solution vendors.
- The appendices include definitions of terms, the detailed forecast database and a reconciliation between this year's and last year's market forecast.



# Executive Overview







## II Executive Overview

### A "Resizing" - The Challenge for Applications Solutions Vendors

The applications solutions market is undergoing a period of major re-orientation as vendors re-orient their offerings to provide up-to-date technology on platforms which are acceptable to users. These changes are causing major financial difficulties for many of the traditional turnkey system vendors such as Siemens Nixdorf Informationssysteme and Mannesmann Kienzle, and necessitating considerable product investment by the major application software product vendors such as SAP and Dun & Bradstreet Software.

The only mid-range equipment platforms which form viable long-term platforms are becoming the IBM AS/400 and Unix-based equipment. Accordingly vendors such as ASK and Cincom who traditionally served the Vax market are having to re-orient their offerings, typically to accommodate Unix. At the same time, vendors such as SAP and Dun & Bradstreet Software who traditionally served the mainframe market are being forced downmarket by the lack of growth in the mainframe sector, while the traditional PC application software product vendors including Lotus are looking to move upmarket taking advantage of Unix.

As well as changes in the platforms used, vendors are also having to cope with fundamental changes in the technology of application software products as these:

- become object-oriented
- database independent
- adopt graphical user interfaces
- incorporate client-server architecture.

The equipment vendors who have traditionally marketed their own equipment packaged with application software products developed by themselves face a double challenge in the new open systems environment. Firstly their software offerings are no longer shielded from competition to the same extent as previously. Now they need to be largely equal in perceived quality to the market leaders. Secondly their equipment must be competitive in its own right. These are difficult challenges to meet and it is likely that equipment vendors will increasingly establish partnerships with suppliers of leading application software products rather than attempting to develop their own software offerings.

The applications solutions market analysed in this report is defined by **INPUT** as comprising two major sectors, application software products and turnkey systems. Turnkey systems are defined as complete systems that combine the equipment platform and the applications software products together with any necessary professional services for customisation and installation support. The forecast for these two delivery modes in Western Europe is shown in Exhibit II-1.

Users are being driven away from customised applications development and towards the use of standard packaged solutions for the following key reasons:

- Risk reduction. Developing a customised application incurs risks in respect of the overall cost and timescale required. Using an existing, preferably tried and tested, product reduces the risk of overruns.
- The cost of a standard application solution will be lower than that of developing a completely new system.
- Implementation of a standard application can considerably reduce the elapsed time-scale required to achieve an operational system.
- The increased availability of standard package solutions appropriate to a client's needs encourages their use. Historically many users had no choice but to develop their own systems; increasingly that choice is available: It is further enhanced by the greater levels of integration available between application packages.

### Exhibit II-1

#### Applications Solutions Western Europe

	User Expenditure \$ Billion		
Sector	1991	1991-1996 CAGR (Percent)	1996
Application Software Products	9.0	18	20.8
Turnkey Systems	12.3	15	24.3

## B Applications Software Products

Exhibit II-2 shows the analysis of the applications software products market by equipment platform type. It is clear from this analysis that a much greater opportunity exists for smaller systems, both in respect of relative size and relative growth rates. This forecast is clearly based on an expectation of continued downsizing by users, namely the utilisation of smaller systems, AS400's instead of 3090's for example, and a continued trend towards distributed processing systems.

### Exhibit II-2

#### Equipment Platform Analysis Applications Software Products Western Europe

	User Expenditure \$ Billion		
Sector	1991	1991-1996 CAGR (Percent)	1996
Mainframe	1.0	3	1.2
Minicomputer	2.9	14	5.6
Workstation/PC	5.1	23	14.0

Most application software product vendors, such as Dun and Bradstreet Software and SAP, who formerly specialised in applications for mainframe computers have now begun the transition to mid-range systems. The target mid-range architectures tend to be the IBM AS/400 and Unix. SAP for example is targeting both of these ranges. The company has acquired Steeb, a vendor specialising in AS/400 based solutions to gain access to an established client base in this sector, while commencing on an extensive product development programme to develop its own mid-range offering.

In addition to the changes taking place in the target architectures upon which application software product vendors base their offerings, there are also fundamental changes taking place in the technology being used. For example, new products such as SAP's R/3 range due for launch in January 1992 will

- be object-oriented
- use client-server architecture
- adopt graphical user interfaces
- exhibit a degree of database independence.



These trends not only apply to downsizing from mainframes onto minicomputers. Many applications which were once based on minicomputers are moving to personal computers or personal computer networks, a trend now becoming apparent in the CAD market.

However there are also a number of factors which are stimulating growth in the application software product market. Firstly users are increasingly recognising the benefits of using application software products even for their core systems where many major users have previously insisted on developing their own software. Taking into account the cost of developing bespoke systems and the timescales involved - not to mention the increasing complexity of doing so in distributed, object-oriented environments - the switch to standard products will continue to gain momentum. Secondly the move to open systems promises to shorten the installed life-time of application software products. Previously many users have been locked into products because of the restricted choice available under the particular proprietary technology used. Open systems offer the promise of greater freedom to discard application software products and select new ones as the business requirements change. The reduced price of the product and the uncoupling of hardware and software replacement make this a feasible possibility.

Within Western Europe the largest individual country market is France, which accounts for approximately one quarter of the entire market. Germany, although having a relatively low market share (17%) in comparison to the size of its economy due to the German preference for the turnkey system delivery mode for an application solution, has now overtaken the United Kingdom as the second largest application software product market in Europe. Over the next five years particularly high growth is expected for applications software products in the Spanish market.

## **C** **Application Product Vendors**

The fragmented nature of the European environment for application software products has hampered the development of indigenous vendors at the expense of US based competitors. This can clearly be seen in the list of leading application software product vendors shown in Exhibit II-3 where four of the five are well known "brand name" US based companies with only the German vendor SAP representing a European based company.

Essentially the application software product vendors can be analysed into three distinct groups:

- Equipment vendors.
- Pan-European independent vendors.
- Small independent vendors.

The equipment market is one area generally assessed as being pan-European in nature. Consequently the equipment vendors operate on a pan-European basis and this influences their applications software product activities. Nearly all the equipment vendors have some involvement in the applications product market, an increasing requirement, as the emphasis switches from the technical features of an equipment platform to the application needs of the user.

Although many equipment vendors also utilise the turnkey systems delivery mode, applications software products represent a significant opportunity and requirement for them. IBM, the largest applications software products vendor in Europe has a range of offerings developed both internally and through third party arrangements. IBM's sheer market size and presence ensures its commanding position in the market overall. In comparison Digital is not well represented in this market sector relying generally on third-party independent vendors to meet its client's application product needs, notably in the manufacturing sector.

**Exhibit II-3**  
**Leading Vendors, 1990**  
**Application Software Products, Western Europe**

Company	Revenues (\$m)
IBM	340
Microsoft	250
Lotus	240
SAP	180
Computer Associates	170

The pan-European independent vendors are, as has already been pointed out, largely US owned. Leading examples within this category are Lotus which has a dominating position in the spreadsheet market and Computer Associates (CA) which is the largest independent vendor in the world for both applications and systems software products. SAP is the only example of a European based company in the leading group. SAP has grown rapidly in the area of IBM platform applications for the manufacturing sector and has benefited from its relationships with Andersen Consulting and Cap Gemini Sogeti. SAP is now operating on a wider basis in Europe whereas hitherto its activities have been fundamentally focused on the German market.



The small independent vendor group covers, in general, the European owned companies that have found it difficult or undesirable to move outside their own home national market. Given a general concentration on specific applications where national differences within Europe are a major obstacle to market development, these vendors have been content to continue to serve their chosen areas of expertise. Different language requirements, local laws and practices have all conspired to make the task of operating on a pan-European basis extremely difficult. Sligos and Concept in addition to SAP, have a desire to operate on a pan-European basis. Sligos, for example, acquired Actis, to gain access to the German market and Concept has rapidly developed a European multinational network. However, Concept has recently become considerably over-extended financially in its attempts to do this.

## **D**

### **Turnkey Systems**

Exhibit II-4 shows the market analysis and forecast for the Western European turnkey systems sector. It is anticipated that improving cost/performance of equipment platforms will depress the equipment proportion of turnkey systems overall. The increasing power of workstations/PC's in particular will have the effect of driving this sector of the market at the highest rate. This is clearly shown in Exhibit II-5 which shows the equipment platform analysis. In contrast the mainframe market is not of great importance in the turnkey sector and will grow at the slowest rate of all equipment sectors as a result of the downsizing of equipment platforms driven by improving cost/performance of computer systems.

To date, equipment manufacturers have not controlled the PC channel as directly as that for minicomputer systems for reasons of scale and sales potential. Workstations/PC's represent an attractive vehicle for many independent application solution vendors to exploit the opportunity for turnkey systems for those clients wanting complete packaged solutions. This represents a potential challenge for the original equipment vendor in terms of optimising market share.

Another important influence on the turnkey systems market is the impact of UNIX. Polarisation of the minicomputer market around the de facto standards of IBM AS/400, and UNIX has made the latter a must for virtually all equipment vendors. The user appeal of UNIX is being increased by the introduction of more advanced facilities and the acceptance of open systems concepts. Increasing availability of UNIX based applications supports this trend.

The turnkey systems sector is probably the delivery mode in the software and services sector which has been the most affected by the changes taking place in the industry.

Up until the mid to late 1980s, there were a large number of proprietary minicomputer manufacturers such as Nixdorf and Kienzle, for whom turnkey systems formed the backbone of their business. Similarly there were a large number of Value Added Resellers selling turnkey solutions based around the offerings of equipment manufacturers such as Bull, Wang, and Data General.

Many of these have been adversely affected by the move to open systems. In the mid-range computer market, there are now only two standards which are generally acceptable to the marketplace, namely the IBM AS/400 and Unix.

This presents an enormous challenge to vendors such as Siemens Nixdorf Informationssysteme. Prior to 1988 Nixdorf was extremely successful in selling its Quattro/8870 range supported by its COMET application software. In 1990 there were still estimated to be 80,000 users of this equipment. However in recent years, Siemens Nixdorf Informationssysteme has faced strong competition from companies offering Unix and PC systems. So the company faces the considerable challenge to develop price/performance competitive personal components and Unix-based midrange systems while simultaneously ensuring that the COMET modules are maintained in functionality and remain competitive in their own right.

Because of these trends, the future for equipment vendors selling turnkey systems looks most promising where there is a strong link between the software and the equipment used. Examples of such markets include point of service financial and retail sector systems and CAD, where the power and graphics capability of the equipment remains important.

A number of modules of the COMET software have already been adapted to run under Unix. However Unix-based applications are increasingly being developed to cater for client-server computing and to utilise graphical user interfaces. Both of these concepts are alien to the application software found in the turnkey systems of the 1970s & 1980s.

So the equipment vendors who specialised in turnkey systems now have to battle on two fronts to stay in this market. Firstly their equipment has to be competitive in both the PC and workstation markets. Secondly their application software has to be the equal of anything available from application software product vendors in the PC and Unix marketplaces. Accordingly the turnkey systems sector is going to continue to be a difficult market for equipment vendors. Rather than develop their own application software products there will be an increasing trend for equipment vendors to license access to "best of breed" products for sale on their equipment.

Another effect of Unix and Open Systems will be to decouple sales of equipment and application software products, as has already happened in the personal computer market. Hence turnkey systems for small and medium-sized businesses will increasingly be sold through dealers.

The largest single country market within Europe is Germany (29% of the total) followed by the United Kingdom (21% of the total). The appeal of the turnkey systems delivery mode varies between different European countries; notably Italian users have preferred custom solutions. These attitudes are likely to change as the cost penalty for an entirely custom built system increases. Customised adaptation of a standard applications product represents an attractive alternative.

## Exhibit II-4

Turnkey Systems  
Western Europe

	User Expenditure (\$ Billions)		
Subsector	1991	1991-1996 CAGR (Percent)	1996
Equipment	6.3	11	10.5
Software Products	2.9	18	6.7
Professional Services	3.1	18	7.1

## Exhibit II-5

Equipment Platform Analysis  
Turnkey Systems

	Western European User Expenditures \$ Billion		
Subsector	1991	1991-1996 CAGR (Percent)	1996
Mainframe	0.5	7	0.7
Minicomputer	7.0	14	13.4
Workstation/PC	4.8	16	10.2



E  
Turnkey Systems Vendors

Exhibit II-6 lists the leading turnkey systems vendors in Western Europe. As is apparent from this list equipment vendors figure strongly in this market, particularly those marketing CAD/CAM systems, for example Prime, McDonnell Douglas and Intergraph. IBM also has a significant position in this market being ranked behind McDonnell Douglas in Western Europe. Nixdorf's position as the market leader has been consolidated by its absorption into SNI (Siemens Nixdorf Informationssysteme) during 1990.

Exhibit II-6  
Leading Vendors, 1990  
Turnkey Systems, Western Europe

Company	Revenues (\$m)
Siemens Nixdorf	970
Prime	400
Digital Kienzle	400
Intergraph	270
McDonnell Douglas	235

However even some of these organisations have experienced difficulties in the last twelve months. McDonnell Douglas has recently sold part of its product range to EDS and Prime is rumoured to be planning to spin off its Computervision subsidiary into a separate public company.

There has also been considerable consolidation amongst the remaining leading turnkey systems suppliers in the last year with:

- Siemens acquiring Nixdorf
- Digital acquiring Kienzle from the Mannesmann Group
- ICL acquiring Nokia Data.



**F**  
**Vendor Issues**

The most significant industry trends affecting application solution vendors are listed in Exhibit II-7 in order of degree of significance.

As can be seen, "information sharing across applications" was regarded by vendors to be the most significant trend occurring at the present time. Users are increasingly looking for better integration and data sharing between applications, and so vendors of application solutions are frequently in the process of integrating their one-off applications into integrated product groups. This often involves underpinning the various application software products with a common relational database.

**Exhibit II-7**  
**Most Significant Industry Trends**  
**Application Solution Vendors, Western Europe**

- |  |
|--|
| <ul style="list-style-type: none"><li>· Information Sharing across Applications</li><li>· Adoption of Unix</li><li>· Greater Use of Networking</li><li>· Graphical User Interfaces</li><li>· Information Sharing across Workgroups</li></ul> |
|--|

Related trends are the adoption of Unix by users and much greater user of networking. Open systems and Unix provide a common platform which facilitates the integration of applications, while networking is often the mechanism for both information sharing across applications, while networking is often the mechanism for both information sharing across applications and information sharing across workgroups. As users move to flatter organisational structures, the sharing of common data between departments and functions is rising in importance.

Finally the use of graphical user interfaces is seen as an important trend by vendors. This trend no longer applies solely to vendors of personal computer software but is also being adopted by vendors who traditionally targeted mainframes and minicomputers. Of course these vendors are now often launching Unix versions of the application software products.

The trends which applications solutions vendors regarded as most favourable to their organisations are listed in Exhibit II-8 while the trends vendors regarded as least favourable are listed in Exhibit II-9.

Integration of applications is regarded as a desirable trend by vendors since it assists vendors in selling a complete business solution. In-house development of applications is still seen as the major competitive threat of many applications solutions vendors and any factors which add to system complexity and make it difficult for users to do their own developments are viewed in a positive light by vendors. Greater integration of applications is believed to act as a deterrent to users carrying out application development in-house.

A requirement for a range of integrated application solutions also facilitates sales for vendors who have adopted this approach, and so tends to favour the larger applications solutions vendors.

The trend towards "greater end user control of purchasing" is also seen as a particularly favourable trend by application solution vendors. Firstly end users are more likely to purchase a standard application solution than the in-house IS department. Secondly end users are perceived to be more sophisticated purchasers who are capable of understanding and appreciating the high levels of functionality which vendors incorporate into their products.

**Exhibit II-8**

**Most Favourable Industry Trends  
Application Solution Vendors, Western Europe**

- Information Sharing across Applications
- Greater End User Control of Purchasing
- Greater Use of Networking
- Graphical User Interfaces
- Adoption of Unix

Many vendors have now adopted, or have under development, versions of products which run under Unix, and make greater use of networking and graphical user interfaces. Accordingly these vendors were in favour of these developments.

However there were also concerns expressed by application solution vendors concerning users' adoption of Unix.

One of these is the concern with changing software products distribution channels. A number of vendors are convinced that they will need to adopt alternative sales channels from their traditional direct sales forces, and so will lose some channel control. Another fear expressed was that Unix will lead to cut-throat price competition for application solutions.

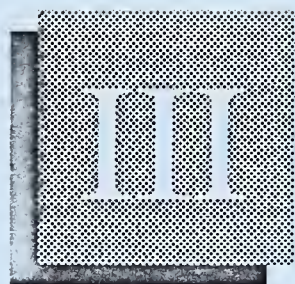
Outsourcing was not perceived to be a particularly positive trend by applications solutions vendors. Again there is the danger with systems operations that vendors will tend to lose contact and influence with users. A similar fear was expressed for systems integration where it was felt that over-zealous project leaders might try to mix and match applications from a number of sources rather than purchase the set of integrated applications software products available from a single application solutions vendor.

### Exhibit II-9

#### Least Favourable Industry Trends Application Solution Vendors, Western Europe

- User Downsizing
- Higher levels of outsourcing
- Changing software product distribution channels

Overall there is a significant level of concern about the possible implications of downsizing from many applications solutions vendors who have traditionally operated in either mainframe or minicomputer environments. Many vendors such as SAP who have traditionally specialised in mainframe-based application solutions, are now launching Unix-based products. SAP's new R/3 product will run under a number of Unix implementations and will feature client/server and object-oriented technology. However there is also concern from the traditional minicomputer-based application solution vendors about users migrating to PC-Lan based solutions.



# Market Analysis and Forecast







### III Market Analysis and Forecast

#### A Market Overview and Definitions

This report analyses the Western European market for two of INPUT's software and service delivery modes, Applications Software Products and Turnkey Systems. The market for application solutions provided via the processing services delivery mode is discussed in a separate INPUT report - *Processing Services Markets Western Europe 1991-1996*.

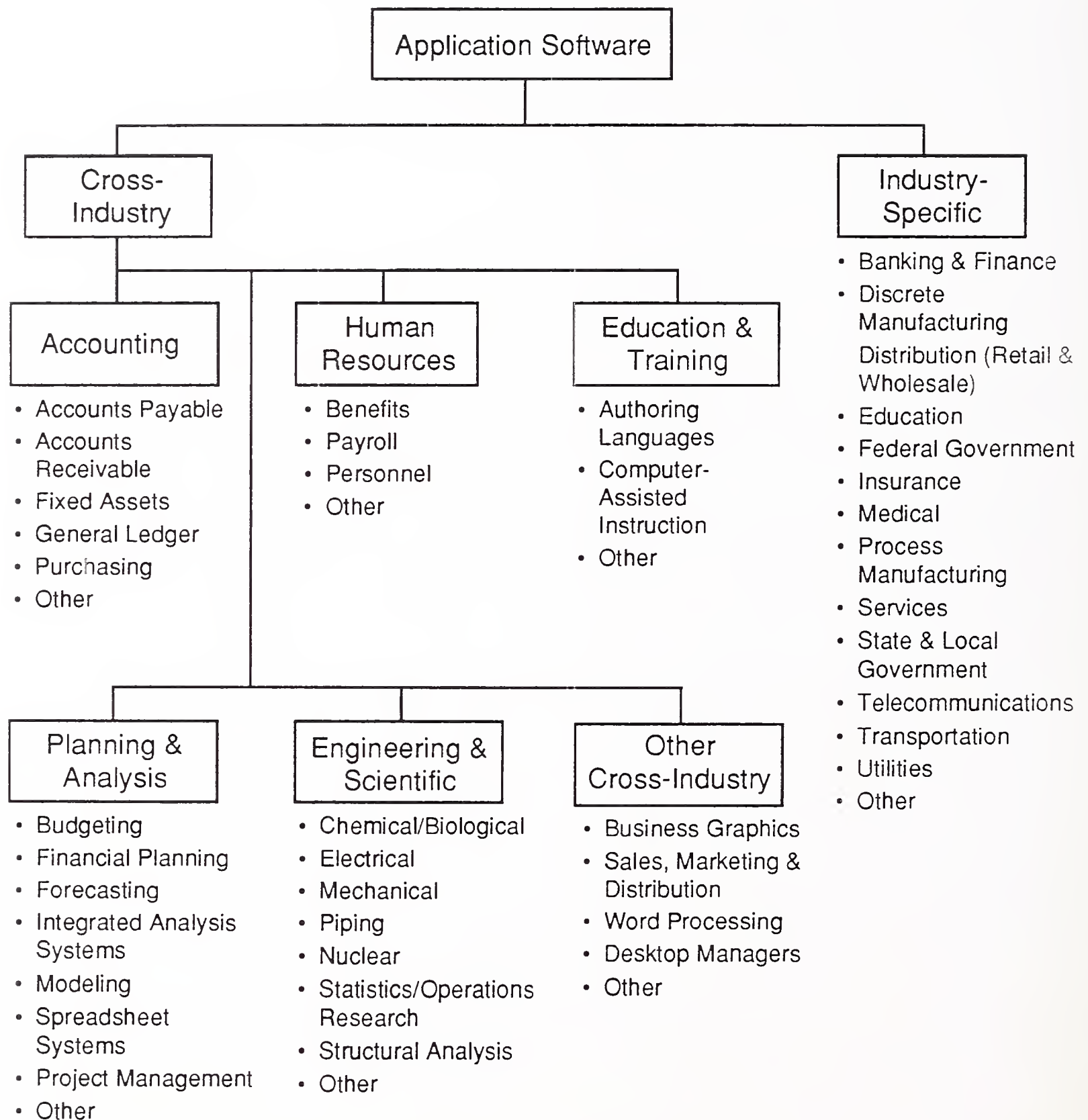
##### 1. Application Software Products

**INPUT** defines the software applications product market as comprising two types of product:

- Industry-Specific Application Software Products - Software products that perform functions related to solving business or organisational needs unique to a specific vertical market and sold to that market only. Examples include demand deposit accounting, MRP II, medical record-keeping, automobile dealer parts inventory, etc.
- Cross-Industry Application Software Products - Software products that perform a specific function that is applicable to a wide range of industry sectors. Applications include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

Exhibit III-1 shows the applications software products market structured by the principal categories and types of product covered.

**Exhibit III-1**  
**Application Software Products**  
**Market Structure**



INPUT's market sizing and forecasts for applications software products are based on end user purchases or licence fees for application software products for use on in-house computer systems. Where installation and support is handled by the software products vendor, INPUT includes this revenue in the software products delivery mode. When work on packages is carried out by third parties independently under a separate contract, this revenue is allowed for in the professional services delivery mode.

The distinctions made between systems and applications software products on different equipment platforms, defined by INPUT into the three categories of mainframe, minicomputer and workstation/PC, are further defined in Exhibit III-2. This exhibit illustrates a layered approach to categorising software products. It shows the different layers of standard software required to run and support general-purpose computer systems. Moving down the various categories of software listed on the left-hand side of the table indicates a closer and closer relationship of the software category to the user and the application. In contrast, moving in the opposite direction indicates the closer relationship of the software category to the equipment platform.

Exhibit III-2 illustrates that it is only in the PC platform area where data base management systems are classified as applications; for all other product categories they are categorised as systems software. The line between system and application software products is usually drawn between database management systems (DBMS) products for all platforms except the PC, where the parameterised DBMS often becomes the application engine itself.

The distinction is also made in Exhibit III-2 between the following two categories of applications.

- Business software products: generic applications such as graphics, spreadsheet and word processing and office automation products.
- Applications software products: both industry specific and cross- industry application packages.

The overall result of this classification in respect of the PC sector is that expenditures for Lotus are primarily listed in the applications products sector whereas the expenditures for Microsoft are listed primarily in the systems software products sector. The system software products market is described in a separate INPUT report *Systems Software Products Markets - Western Europe 1991-1996*.

The software products sector (both systems and applications) has shown remarkable growth over the last decade. However that situation has now changed and we are witnessing a period when the market for software products is expected to grow at a markedly slower rate. That perspective is illustrated in Exhibit III-3.

**Exhibit III-2**  
**Definitional Map of Software Classes**

	Equipment Platform		
Software Product Category	Mainframe	Minicomputer	Workstation/PC
Systems Control	S	S	S
Operations Management Tools	S	S	S
Applications Development Tools			
- Program Development Tools	S	S	S
- DBMS	S	S	S A
General Business Software	A	A	A
Application Specific Products	A	A	A

S = System Software Products

A = Applications Software Products



Exhibit III-3

Western European Software Products Markets  
Comparative Growth

	User Expenditures \$ Millions					
Sector	1979*	1979-1989 CAGR (percent)	1989*	1990 <sup>+</sup>	1990-1996 CAGR (percent)	1996 <sup>+</sup>
System Software Products	530	33	9,140	11,400	11	21,500
Application Software Products	275	35	5,700	7,600	22	20,800
Total Software & Services Industry	7,000	22	52,060	67,000	18	155,000

Notes    \* at 1990 exchange rates  
          <sup>+</sup> at 1991 exchange rates

This relative slow-down is caused by a number of factors of which the most significant are:

- Economic environment slow-down
- Downsizing and its impact on software product pricing.
- Lower inflation expectations in the 1990s.

The general slowdown in the rate of growth of equipment sales can partly be attributed to the expected recession in the overall economy. However, a far more significant factor is that of the downsizing phenomenon. Downsizing, users selecting smaller lower cost equipment platforms to replace larger systems, is fundamentally driven by the price/performance discontinuity between, at one extreme, mainframes and at the other workstations and PC's. This price performance discontinuity, of the order 200 times, combined with open software standards, leads to totally new system architecture possibilities that are radically altering the market for system software products.



However there are also a number of factors which are stimulating growth in the application software product market. Firstly users are increasingly recognising the benefits of using application software products even for their core systems where many major users have previously insisted on developing their own software. Taking into account the cost of developing bespoke systems and the timescales involved - not to mention the increasing complexity of development in distributed, object-oriented environments - the switch to standard products will continue to gain momentum. Secondly, the move to open systems promises to shorten the installed life-time of application software products. Previously many users have been locked into products because of the restricted choice available under the particular proprietary technology used. Open systems offer the promise of greater freedom to discard application software products and select new ones as the business requirements change. The reduced price of the product and the uncoupling of hardware and software replacement make this a feasible possibility.

## 2. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.) systems software, and packaged or custom application software into a single system developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and support services provided. Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialised equipment such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Turnkey systems are often marketed through channels known as value-added resellers.

Value-Added Resellers (VARs) add value to computer equipment and/or software and then resell it to an end user. The major value added is usually application software for an industry or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services.

Turnkey systems are divided into two categories:

- Industry-Specific Systems - systems that serve a specific function for a given industry sector, such as automobile dealer parts inventory, medical record-keeping, or discrete manufacturing control systems.
- Cross-Industry Systems - systems that provide a specific function that is applicable to a wide range of industry sectors, such as financial planning systems, payroll systems, or personnel management systems.

Turnkey systems may be thought of as four layers of product and service packages provided and maintained by the same vendor:

- Information systems equipment
- Systems software products (plus maintenance and support)
- Standard applications software products (plus maintenance and support)
- Professional services (customisation of applications software, training and consultancy).

The range of total solutions from third parties is illustrated in Exhibit III-4. It shows that the degree of customisation can vary from nothing to total customisation. The distinction between systems integration and turnkey systems is that systems integration is a very large, totally unique project contracted by a single customer. Turnkey systems are those where vendors have developed standard applications and sell them to as wide a customer base as possible, adding customisation where necessary.

Turnkey systems are sold on full ranges of equipment. The degree of customisation and the price of the complete system increases with the power of the equipment platform. Exhibit III-5 illustrates this and indicates that turnkey systems on PCs start at around \$5,000 in price and go up to \$50,000, including equipment. Systems on minis start at around \$20,000 and can go up to \$1 million. Mainframe systems mostly start at around \$500,000 and can go well above \$1 million.

Most turnkey systems are sold on workstation/PCs and minicomputers. Mainframe systems tend to have a high degree of customisation and so, in general, fall outside the INPUT definition of turnkey systems.

Exhibit III-4

The Total Solutions Market  
Third-Party Systems

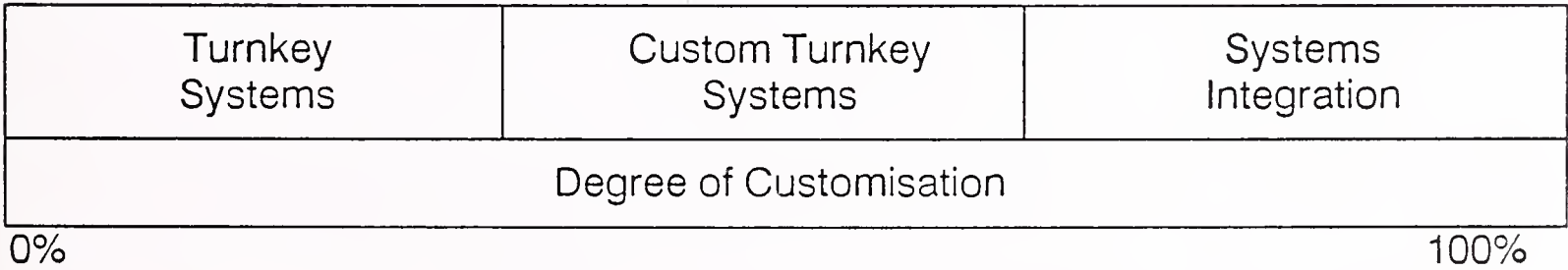
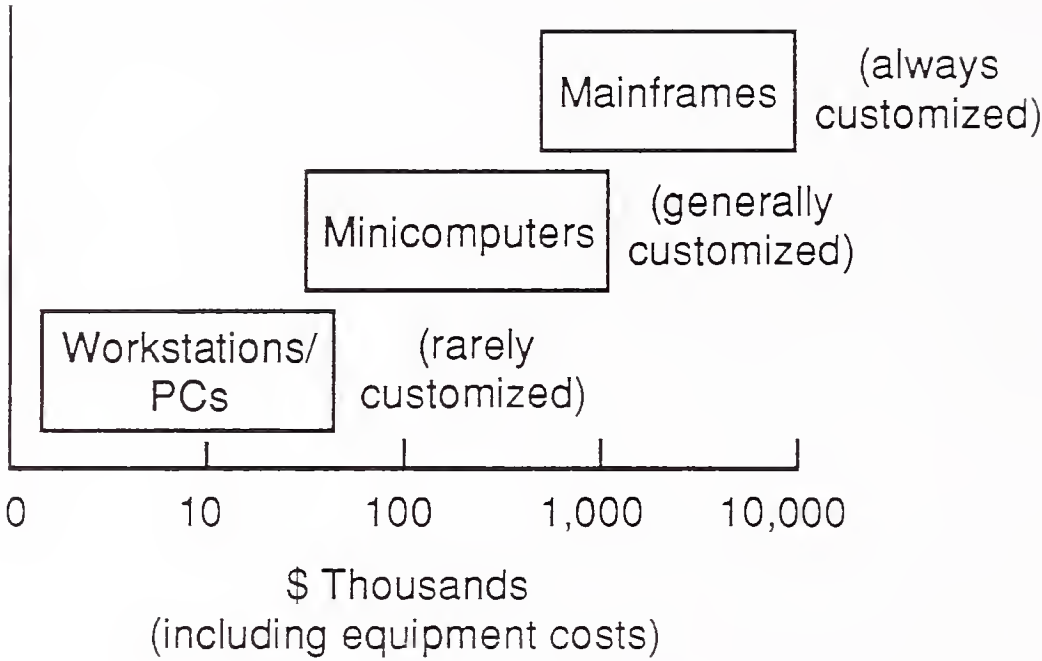


Exhibit III-5

Turnkey Systems Price Spectrum





Turnkey systems vendors generally have developed the applications software in-house, although there are instances where they licence application products from other vendors to market and sell themselves. To sell a complete turnkey system, they take title to the equipment from the equipment vendor, and then deliver, install and support it. Alternatively, the turnkey systems vendor could be an OEM who buys the equipment, relabels it and packages it up with his own application software products.

For minicomputer systems, turnkey system vendors will generally have formal agreements with one or more equipment vendors by which they can take title to the equipment. In so doing, they act as value-added resellers (VARs). For workstation/PC systems, the vendor may have an agreement with a distributor of the equipment rather than the equipment vendor.

Turnkey systems vendors will generally concentrate on a small range of equipment in order not to over-extend their support capabilities. Equally, it is in the interest of the equipment vendor to limit the better VARs to just their own line of equipment. This is done through formal agreements, which will probably be part of a carefully defined VAR programme.

Particularly for minicomputer and mainframe systems, many independent software vendors sell competing packages to turnkey systems, but without taking title to the equipment. The delivered solution to the end user has all the same components as in turnkey systems, but the equipment vendor takes responsibility to contract, install and maintain the equipment. INPUT defines and monitors such sales by their component elements - software products, plus related professional services. In this report, these sales are referred to as software product solutions, and the wider market encompassing both turnkey systems and software product solutions as the packaged total solutions market.

In many areas of continental Europe, the word turnkey (in French "cle en main", in Italian "sistemi chiavi in mano") is used for both systems integration and for software product solutions. In addition, southern European users, Italians in particular, prefer buying solutions that are unique. Many have an aversion to buying mass-marketed products which could very well be sold to the competitor next door. In these markets, vendors have to package their solutions to look like bespoke solutions, even if in reality they are custom turnkey or software product solutions. Often vendors call their systems "turnkey", even though they are selling them as bespoke systems.

Readers should be careful to differentiate between the general use of the term "turnkey" and the specific way INPUT defines and uses the term "turnkey systems".

The PC market has become a high-volume sales market, and equipment vendors have accepted that they have to use a range of third-party sales channels. In so doing they have lost control over the end user. The same is not the case for minicomputer and mainframe systems, and equipment vendors still prefer to retain title to their equipment and so retain knowledge of who the end user is. For this reason, VARs often do not take title to the equipment, and deliver their application software as software product solutions rather than turnkey systems.



With software product solutions, the independent software products vendor will, in all probability, make the sale. As with turnkey systems, it will have a formal, commissioned relationship with one or more equipment vendors. The end user will receive a complete solution, but will have two contracts - one from the software products vendors, and one from the equipment vendor. The equipment vendor will be responsible for installing and maintaining the equipment. Either the software products vendor or the equipment vendor can deliver and maintain the systems software. The software products vendor will deliver and maintain the application software products, plus any additional services, such as customisation, training, consultancy, etc.

The software products vendor will normally work with one or more equipment vendors as a VAR. The formal agreement will be different to that for turnkey systems, as, in this case, the VAR will not take title to the equipment. Exhibit III-6 illustrates how the total revenue is broken down for turnkey systems and software product solutions.

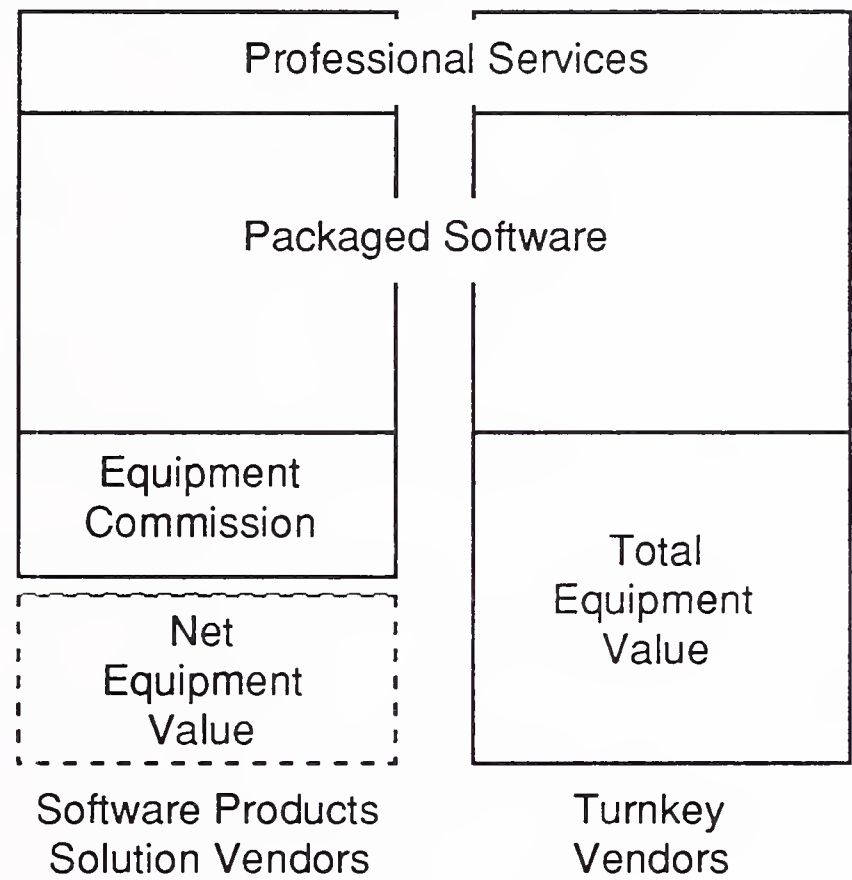
For end users, the question of whether one or two vendors deliver the packaged total solution is not important. Many of the key issues facing VARs are, therefore, the same whether they are delivering their systems as turnkey, or as components. With user research, INPUT has, therefore, not tried to differentiate between these two types of delivery modes.



In many instances, VARs who sell turnkey systems also sell software product solutions, but on different equipment. Typical examples are Metier and Software Sciences. Metier sells turnkey systems on Hewlett-Packard equipment, and software product solutions on IBM. Software Sciences sell turnkey systems on Data General equipment, and software product solutions on IBM, Tandem and Stratus equipment.

The fact that VARs sell turnkey on different equipment from that on which they sell software product solutions is often due to the attitude of specific equipment vendors. IBM in particular, and to a lesser degree Digital, try to maintain control over end users by retaining title to their equipment. Their strength in the minicomputer market and success in this strategy is directly reflected in the low penetration of turnkey systems and the high penetration of software product solutions in the European minicomputer market.

Exhibit III-6

Revenue Breakdown for Different Types  
of Packaged Total Solutions Vendors



-  Revenue passing through turnkey and software products vendor's books
-  Revenue passing through equipment vendor's accounts

## B Market Size and Growth

### 1. Forecast Assumptions

The market assessments and forecasts provided in this report cover the period 1990 through to 1996 and assess end-user expenditure for applications solutions products. Market sizes are assessed in local currency and converted into US dollars for aggregation and comparative purposes.

Forecasts are calculated in actual monetary terms and therefore include allowances for inflation.

### 2. Market Forecast

The forecast for the total Western European market for the applications software products and turnkey systems is shown in Exhibit III-7.

The turnkey systems market itself is analysed into two primary components: equipment sales, which represents about \$6 billion in the 1991 market, mainly consisting of PC and minicomputer systems, and the software component comprising software product applications, customisation and other professional services. The latter two subcomponents are included within the applications software products sector where a user contracts for these services as part of the software product sale. However, where customisation and professional services are contracted separately they are included in the professional services market sector. This separate market sector is discussed in a separate INPUT report *The Western European Market for Professional Services - 1991-1996*.

As shown in Exhibit III-7 the combined opportunity in these two market sectors is expected to exceed \$45 billion in end user expenditures by 1996, representing compound annual growth of around 16%. It can be seen that the applications software products segment is expected to grow at the faster rate and that it is the continuing decline in unit equipment costs that are impacting the overall growth rate of the turnkey systems sector.

Four major factors are driving the market towards increasing acceptance of application solutions delivered either as applications software products or turnkey systems:

- The reduction in risk associated with the implementation of tried and tested standard software products. Risk reduction is important in the areas of cost and implementation time.
- The reduction in cost for the initial implementation and subsequent maintenance.
- The increased speed of implementation.

- The increased availability of standard package solutions appropriate to a client's application needs and the increasing availability of complete systems or modules that allow integration between applications.

### Exhibit III-7

#### Application Software Products and Turnkey Systems - Western Europe

	User Expenditures \$ Millions			
Sector	1990	1991	1991-1996 CAGR (Percent)	1996
Application Software Products	7,600	9,000	18	20,800
Turnkey Systems	10,800	12,300	15	24,300

## C Applications Software Products

### 1. Applications Software Products

The total applications software products market is analysed into three subsectors related to equipment platforms: mainframe, mini and workstation/PC. This analysis is illustrated in Exhibit III-8, and shows the forecast growth rates for each of these sectors.

Exhibit III-8 clearly indicates the much greater opportunity available for smaller systems, both in respect of relative size and relative growth rates. The higher growth rates expected for smaller systems, notably the workstation/PC sector can be attributed to the general trend towards downsizing systems. Additionally the cost level of smaller systems emphasises the need to utilise standard applications package products rather than to implement costly custom written systems. These trends are reinforced by the increasing costs and shortages of skilled programmers and by the need to implement applications more quickly.



**Exhibit III-8**  
**Applications Software Products Market**  
**Western Europe**

	User Expenditures \$ Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	1,000	1,000	3	1,460
Minicomputer	2,500	2,900	14	5,550
Workstation/PC	4,100	5,100	23	12,400
Total	7,600	9,000	18	19,410

The different growth rates projected for the three major equipment platform categories will have a significant impact on their relative proportions of the total application product market. This is clearly shown in Exhibit III-9.

Additional factors determining these different growth rates include:

- The move towards distributed systems possibly using client-server architectures rather than centralised systems.
- The movement towards international standards, open systems that in effect provide a more stable environment within which software developers can operate.
- The trend towards the use of graphical end-user interfaces, making it easier for software developers to market standard applications.

The growing importance of the workstation/PC is a direct reflection of the continuing improvements being made in the power/performance of this type of equipment platform. The Intel 486 chip today allows equipment vendors to sell desktop PCs that are as powerful as minis were a few years ago. These machines can run on a variety of operating systems - MS/DOS, OS/2 or UNIX. End users have much greater flexibility and can choose between single tasking/single user environments under MS/DOS or multitasking/multiuser environments under UNIX.

However there is also a growing trend for traditionally PC-based application software product vendors to make their products available in minicomputer or workstation based versions under Unix. Examples of this include:

- Lotus' plan to offer 1-2-3 on the RS/6000
- Autodesk's plans to offer Autocad on Hewlett-Packard Apollo workstations.

The increasing use of kernel software, or reusable software modules, that allow vendors to prepare different versions of applications for the countries of Western Europe or for different user environments is also a general growth factor for applications software within the market.

Exhibit III-10 shows the country analysis of the Western European market. The largest individual country market is France, representing one quarter of the entire market. Germany is the second-largest country market, accounting for some 17% of the Western European total. The relatively low market share for Germany is witness to the strong turnkey systems market there which represents the favoured delivery mode for applications solutions.

Exhibit III-9  
Equipment Platform Trends  
Western Europe

	Proportion of Total Market (Percent)	
Subsector	1991	1996
Mainframes	14	6
Minicomputer	33	27
Workstation/PC	53	67

## Exhibit III-10

Applications Software Products  
Comparative Country Markets

Market	Market Forecast (\$ Millions)			
	1990	1991	1991-1996 CAGR (Percent)	1996
France	1,970	2,300	20	5,900
Germany	1,250	1,500	18	3,400
United Kingdom	1,150	1,300	14	2,550
Italy	1,100	1,250	16	2,700
Sweden	245	300	21	775
Denmark	165	190	16	400
Norway	135	160	19	400
Finland	145	175	18	400
Netherlands	510	600	19	1,400
Belgium	270	320	18	720
Switzerland	250	300	18	670
Austria	115	135	19	325
Spain	260	310	22	850
Rest of Europe	100	120	20	300
Total (rounded)	7,600	9,000	18	20,800

## 2. Competitive Analysis

The leading application software product vendors in Western Europe are listed in Exhibit III-11. United States owned software product companies are strongly represented in this list with seven in the leading ten. These U.S. owned companies tend to have a relatively strong position in a number of European countries in contrast to the European vendors who tend to have a significant market only in their own national home base. There are no European multinational application software product vendors on the scale of IBM, Lotus or Computer Associates. However SAP is now endeavouring to rectify this situation. In 1990, 30% of the company's European revenues were derived outside of Germany.

This situation is reflected in the relatively fragmented nature of the market, the leading ten vendors only accounting for some 22% of the total market as is shown in Exhibit III-11. However this sector is gradually becoming more concentrated as acquisitions continue at a rapid pace. SAP acquired Steeb in 1990 to acquire access to the AS/400 user base, while D&B Software completed the acquisition of MSA. Computer Associates has just announced the proposed acquisition of Panasophic Systems while one of Panasophic's competitors in the UK, Pioneer Computer Systems, has recently been acquired as well.

#### **a. Equipment Vendors**

Nearly all equipment vendors operating in Europe have some involvement in the applications products market, in line with the increasing emphasis on the application of information systems rather than their technical features.

As was seen in Exhibit III-11, IBM is by far the largest equipment vendor represented in this market. IBM has a range of applications software products developed both internally and by third parties. Digital, despite its position as the second largest equipment vendor to IBM, is not well represented in the applications software products market. Digital's primary application products are cross-industry office based products, for example DECCalc (a spreadsheet) and DECWord (a word processing package). In most industry specific areas Digital utilises third party independent vendors to supply applications products; this is notable in the manufacturing sector. In addition IBM has embarked on an extensive policy of taking minority shareholdings in a number of application software product vendors, for example, PAXUS, to extend its application coverage in each vertical market.

#### **b. Independent Vendors**

This group of vendors can be further sub-divided into two further groups:

- The pan-European independent software application vendors.
- Other independent vendors, generally European owned companies serving primarily their own national market.



## Exhibit III-11

**Leading Application Software Product Vendors  
Western Europe**

Rank	Company	Market Share (Percent)	Estimated Revenues 1990 (\$ Millions)
1	IBM	4	340
2	Microsoft	3	250
3	Lotus	3	240
4	SAP	4	180
5	Computer Associates	2	170
6	Wordperfect	2	160
7	Ashton-Tate	1	115
8	Siemens Nixdorf	1	95
9	Autodesk	1	85
10	Dun & Bradstreet Software	1	82
	Others	77	5,880
	Total	100	7,600

The leading pan-European independent software application vendors are largely U.S. owned - for example, Lotus, which is reputed to hold 70% of the world market for spreadsheet application products, and Computer Associates (CA) which is the largest independent vendor of both applications and systems software products on a worldwide scale. In Europe systems software products account for almost two thirds of CA's entire revenues. CA has a strong market position in Europe serving a variety of application areas and providing software products across all of IBM's equipment platforms. Perhaps a significant advantage to CA is its ability to supply both systems and applications products at a computer system installation. Recently, Computer Associates has announced its intention to make the Apple Macintosh one of the strategic clients in the client-server version planned for its Masterpiece application portfolio.

Dun and Bradstreet after its acquisition of Management Sciences America (MSA) is now the ninth-largest application software products supplier in Western Europe. It is estimated that Dun & Bradstreet's revenue totals \$82 million for Europe in this sector and is spread across primarily financial and manufacturing applications.

Two U.S. independents that have experienced growth well ahead of the market are the PC software suppliers Microsoft and WordPerfect. Microsoft is estimated to have had European revenues from applications software worth \$250 million in 1990. Their key application products are MS Word, Excel and the integrated package named Works. For Microsoft, applications software product sales are growing faster than systems software products; applications products now account for more than 50% of their total revenues. Whereas Microsoft holds a strong position in the PC word processing market in France and Germany, WordPerfect holds a dominant position in the U.K., the Benelux countries and the Nordic countries.

In contrast to this group of U.S. owned companies, the European owned application product companies have found it difficult to move outside their home markets and become pan-European suppliers. This can largely be attributed to the different nature of the products that they have been able to develop. U.S. owned companies that have established worldwide positions, including being pan-European, have achieved it on the basis of cross-industry products with universal appeal developed within the largest single market for software products in the world. European vendors have always had to contend with the immediate problems of language translation within Europe and thus have not had the scale economies of U.S. owned vendors operating in their own home market.

European owned applications products vendors that are operating on a pan-European basis include Concept, Sligos and SAP.

Concept, in its quest to support multinationals now has subsidiaries in Italy (CDS and Fienco), Switzerland (AKER), Belgium (Concept Benelux), Spain (Concept Iberica) and Portugal (SiFi). Concept is active in the Netherlands, the U.K. and Germany as Holland Automation International. A geographic analysis of Concept's 1990 revenues indicates, however, that around 70-75% were derived from France leaving only one quarter derived from the rest of Europe.

Both Sligos and SAP are relatively limited in their coverage of the whole of Europe as yet. Sligos acquired Actis, a German vendor to obtain access to the German market and Mesarteam for access to the Italian market. SAP derived approximately 70% of its 1990 European revenues from within Germany, but is now making determined efforts to establish its products more widely.

In contrast to this group of vendors, which is targeting pan-European presence, exists another group of vendors which could be termed the "national independent" application product vendors. These companies typically see sufficient opportunities in their own domestic markets where their own area of specialisation is considered to be impenetrable by foreign owned companies.



## D Turnkey Systems

### 1. Market Analysis

The market analysis and forecast for the turnkey systems market in western Europe is shown in Exhibit III-12. The system equipment sector is expected to show markedly slower growth than that for software products and other services provided as part of the overall turnkey system contract. As is shown in Exhibit III-13 this slower growth rate will have a significant impact on the relative proportions of the two main sectors, placing software products and other services into the ascendancy. This change is driven by the overall tendency towards lower equipment costs for any given level of required performance.

The increasing power of the workstation/PC means that more turnkey systems can be packaged up on workstation/PC platforms rather than on minicomputers. Apart from shifting the importance of the equipment platform for turnkey systems towards the workstation/PC, this trend is likely to effect radically the way independents sell their standard application software.

The main reasons that so many independent vendors do not sell their standard applications as turnkey systems in the midrange equipment market is that both IBM and Digital, the leading minicomputer vendors in Western Europe, prefer to retain control over the title to their equipment. Independents working as VARs with these companies generally sell their total solutions via the applications product channel, rather than as turnkey systems. Through this strategy, IBM and Digital retain contact with the end user. The companies themselves, not the VARs, install and support the equipment with the end user.

In the PC market, equipment vendors have to rely heavily on third party sales channels. This has created a layer between the equipment sales and the application sale. Equipment vendors therefore cannot control their VARs in the PC market in the way that they still can in the minicomputer market.

Independent vendors have far more freedom in how they sell their applications in the PC market and which equipment to package into their total solutions. Therefore turnkey systems is the predominant marketing channel for independents in the PC market, as opposed to the application product channel as it is in the minicomputer market.

As PCs continue to take over from minicomputers in this market, independents will become freer from the control of equipment vendors. The likelihood is that they will elect to sell their applications as turnkey systems, when they are free to make the choice. As a result, equipment vendors will increasingly see that they are losing control over the marketing channel.

Other important factors that will affect the overall development of the turnkey systems market in the 1990s include:

- UNIX and the drive in Western Europe towards open systems.
- The Single European Act and the gradual evolution of pan-European markets for specific industrial sectors during the 1990s.

### Exhibit III-12

#### Turnkey Systems Market Forecast, 1991-1996 Western Europe

	(\$ Millions)			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1995
System Equipment	5,700	6,300	11	10,500
Software and Other Charges	5,100	6,000	18	13,800
Total	10,800	12,300	15	24,300

### Exhibit III-13

#### Turnkey System Subsector Trends Western Europe

	Proportion of Total Market (Percent)	
Sector	1991	1996
System Equipment	51	43
Software and Other Charges	49	57



The market for UNIX based application software products is another important factor in the turnkey system market. The principal reason for the rapid growth of UNIX systems has been its de facto adoption as an operating system standard by equipment vendors, notably by those vendors with a limited share of the overall market. The economics of software development has led to a polarisation (amongst mid-range systems) around:

- IBM systems.
- Digital VMS systems.
- UNIX systems.

This polarisation is now becoming even more pronounced with most vendors moving to adapt their products to conform to one or both of the IBM AS/400 or Unix.

The introduction of more advanced facilities under UNIX and a widening acceptance of open systems concepts has in turn encouraged application software product vendors to develop UNIX based products. As more products become available so UNIX systems become more attractive to users and a virtuous circle of market forces operates.

The effect of the Single European Act on the turnkey systems market will be to gradually open up specific vertical or niche markets and make them more pan-European. For the turnkey systems vendor, this will lead to greater opportunities to sell standard solutions to wider markets.

Many vendors are looking closely at the likely impact of the Single European Act on specific industrial sectors and on their related software and services markets. There will be considerable competition in those markets positively affected by the Single European Act legislation. The larger independents will seek to take over those national independent vendors currently specialising in these areas.

Exhibit III-14 provides a more detailed analysis of the turnkey systems market components in Western Europe. The professional services elements are forecast to exhibit high growth with considerable demand arising for consultancy and education and training services (ie. other professional services) as turnkey systems become more integrated into the end user environment.

Exhibit III-15 shows an analysis of the Western European turnkey systems market by equipment platform type. The most important equipment market in 1991 was that for minicomputers, accounting for nearly 60% of the total market. The second largest sector was that for workstation/PCs taking just under 40% of the total market, with mainframes only accounting for some 4% of the market. The highest growth is anticipated in the workstation/PC sector.

Exhibit III-14  
Turnkey Systems Components

	Western European User Expenditures \$ Billions		
Subsectors	1991	1991-1996 CAGR (Percent)	1996
System Equipment	6.3	11	10.5
Software Products	2.9	18	6.7
Professional Services	3.1	18	7.1
Total	12.3	15	24.3

Exhibit III-15  
Equipment Platform Analysis  
Turnkey Systems, 1991-1996

	Western European User Expenditures \$ Billion		
Subsector	1991	1991-1996 CAGR (Percent)	1996
Mainframe	0.5	7	0.7
Minicomputer	7.0	14	13.4
Workstation/PC	4.8	16	10.2

Exhibit III-16 shows the country market analysis for Western Europe. Turnkey systems do not have the same appeal throughout Europe. In the Mediterranean countries, end users tend to prefer bespoke systems, rather than standard applications packaged up as turnkey systems. With the cost of turnkey systems significantly less than equivalent bespoke systems this attitude is likely to gradually change during the 1990s as these areas of Europe gain exposure to foreign vendors.

The largest single country market is that of Germany (29%) followed by the United Kingdom (21%). As has already been pointed out the French market has a relative preference for applications solutions delivered as applications software products rather than turnkey systems. Consequently France only accounts for around 15% of the total European turnkey systems market.

### Exhibit III-16

#### Turnkey Systems - Comparative Country Markets Western Europe

Country	Market Forecast \$ Millions			
	1990	1991	1991-1996 CAGR (Percent)	1996
France	1,650	1,900	14	3,700
Germany	3,100	3,550	15	7,200
United Kingdom	2,350	2,600	12	4,600
Italy	690	770	11	1,300
Sweden	340	400	17	880
Denmark	250	290	14	560
Norway	185	210	17	450
Finland	180	200	15	410
Netherlands	480	550	16	1,200
Belgium	215	250	16	530
Switzerland	550	640	16	1,300
Austria	230	260	16	550
Spain	420	500	18	1,150
Rest of Europe	200	220	17	480
Total (rounded)	10,800	12,300	15	24,300

## 2. Competitive Analysis

The leading turnkey system vendors in Western Europe in 1990 are listed in Exhibit III-18. Companies marketing CAD/CAM systems figure strongly, notably Prime, McDonnell Douglas, Intergraph and IBM. However even some of these organisations have had problems in the last twelve months. McDonnell Douglas has recently sold part of its product range to EDS and Prime is rumoured to be planning to spin off its Computervision subsidiary into a separate public company.

There has also been considerable consolidation amongst the remaining leading turnkey systems suppliers in the last year with:

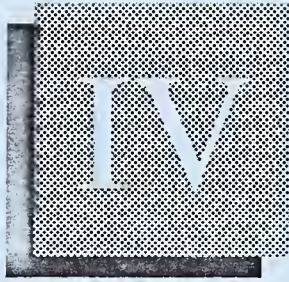
- Siemens acquiring Nixdorf
- Digital acquiring Kienzle from the Mannesmann Group
- ICL acquiring Nokia Data.



## Exhibit III-17

Leading Turnkey System Vendors, 1990  
Western Europe

Rank	Company	Estimated Revenues 1990 (\$ Millions)	Market Share (Percent)
1	Siemens Nixdorf	970	9
2 =	Prime	400	4
2 =	Mannesmann Kienzle	400	4
4	Intergraph	270	3
5	McDonnell Douglas	235	2
6	IBM	230	2
7	Unisys	150	1
8	Reuters	145	1
9	Nokia Data	130	1
10	ICL	125	1
	Others	7,745	72
	Total	10,800	100



# Country Market Analysis





IV Country Market Analysis

A  
France

The market analysis and forecast for the French applications software products market and turnkey systems markets are shown in Exhibits IV-1 and IV-2 respectively.

Concept was the leading vendor of application software products in France in 1990 as is shown in Exhibit IV-3. In particular Concept has a leading position in the design and development of financial software products available on PCs. Concept also sells turnkey systems on PC platforms which are developed by Technic Informatique, a subsidiary company. Concept is currently in financial difficulties following heavy borrowings to finance an ambitious acquisition programme.

Exhibit IV-1

Application Software Products Market  
France

	User Expenditures FF Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	1,100	1,150	4	1,400
Minicomputer	4,200	4,800	13	9,000
Workstation/PC	5,800	7,200	26	23,000
Total	11,100	13,150	20	33,400

Sligos is active in both the applications software products market as well as the turnkey system market as can be seen in Exhibit IV-4. Although Bull is ranked just outside the leading group, many smaller French VARs use Bull equipment. Sinorg, for example, specialises in local government with software applications products for finance, elections and healthcare.





## Exhibit IV-2

Turnkey Systems Market  
France

	User Expenditures FF Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	4,900	5,500	10	9,000
Software and Other Charges	4,400	5,100	18	11,800
Total	9,300	10,600	14	20,800

## Exhibit IV-3

Leading Application Software Product Vendors  
France

Rank	Vendor	Estimated Revenues 1990 (FF Millions)
1 =	Microsoft	350
1 =	ISE International	350
3	Lotus	330
4	CGI	315
5 =	Concept	300
5 =	IBM	300
7	GSI	270
8	Computer Associates	180
9	Sopra	120
10	D&B Software	100

**Exhibit IV-4**  
**Leading Turnkey Systems Vendors**  
**France**

Rank	Vendor	Estimated Revenues 1990 (FF Millions)
1	Siemens-Nixdorf	430
2 =	Concept	400
2 =	Sligos	400
4	Bull	370
5	Axime	315
6	Prime	300
7	Syseca	225
8 =	Mannesmann Kienzle	220
8 =	IBM	220
10	Gegid	200

**B**  
**Germany**

Exhibits IV-5 and IV-6 show respectively the market analysis and forecast for the applications products and turnkey systems markets in Germany. The favoured delivery mode for applications solutions in Germany is undoubtedly the turnkey system approach. In 1991 approximately 70% of user expenditure on applications solutions was spent on turnkey systems making Germany the largest national market for this delivery mode in Europe. The leading vendors in the two applications solutions markets are listed in Exhibits IV-7 and IV-8.

One of the factors that has supported the development of a strong turnkey market in Germany is the strength of the manufacturing sector in its use of CAD/CAM and CAE systems. Both Nixdorf and Digital Kienzle offer a range of industrial systems as well as financial and general business turnkey systems. Norsk Data, the Norwegian equipment vendor, developed its turnkey CAD/CAM package, Technovision, in Germany so that it could specifically compete in this market. Another German company Taylorix sells turnkey systems based on PCs from IBM, Siemens and Toshiba.

Although there is a preference to buy from German vendors, users are very particular about the technical capabilities of their systems. Consequently a number of U.S. owned vendors have a strong showing in this market, for example, Prime and Intergraph. Germany is Intergraph's strongest country market in Western Europe.

#### Exhibit IV-5

#### Applications Software Products Market Germany

Subsector	User Expenditures DM Millions			
	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	370	400	3	450
Minicomputer	680	800	13	1,500
Workstation/PC	1,050	1,300	24	3,800
Total	2,100	2,500	18	5,800

## Exhibit IV-6

Turnkey Systems Market  
Germany

	User Expenditures DM Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	2,700	3,000	12	5,300
Software and Other Changes	2,475	2,950	18	6,800
Total	5,175	5,950	15	12,100



## Exhibit IV-7

Leading Application Software Product Vendors  
Germany

Rank	Vendor	Estimated Revenues 1990 (DM Millions)
1	SAP	210
2	IBM	130
3	Compunet	100
4 =	Microsoft	85
4 =	Datev	85
6 =	Siemens Nixdorf	80
6 =	Lotus	80
8	Computer Associates	70
9	Strassle	60
10	WordPerfect	55

## Exhibit IV-8

Leading Turnkey Systems Vendors  
Germany

Rank	Vendor	Estimated Revenues 1990 (FF Millions)
1	Siemens Nixdorf	1,000
2	Mannesmann Kienzle	330
3	Prime	220
4	Intergraph	170
5	IBM	100
6	Taylorix	85
7	mbp Software & Systems	60
8 =	Compunet Computer AG	50
8 =	Reuters	50
10	McDonnell Douglas	45

## C

### United Kingdom

The market analysis and forecast for the applications products and turnkey systems markets are shown in Exhibits IV-9 and IV-10. The United Kingdom is one of the most competitive markets for applications solutions in Europe due to a very high representation of U.S. owned vendors who view the U.K. as an excellent entry point for Europe and a convenient location for their European headquarters. The leading vendors in the applications products and turnkey systems markets in the United Kingdom are shown in Exhibits IV-11 and IV-12.

The influence of the CAD/CAM suppliers in the market is clearly shown with Prime and McDonnell Douglas in market leadership positions. The U.K. is the largest European market for McDonnell Douglas which, in addition to CAD/CAM, specialises in local government systems for the police and ambulance services and in the healthcare sector.

ICL, now majority owned by Fujitsu, is a leading turnkey vendor in the minicomputer sector. Hoskyns, now part of the Cap Gemini Sogeti group, is the leading independent turnkey system vendor with a range of systems based on IBM, Digital and Hewlett Packard platforms. Kalamazoo is an important vendor of commercial systems for small businesses based on PCs.

#### Exhibit IV-9

#### Applications Software Products Market United Kingdom

	User Expenditures £ Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	75	75	1	80
Minicomputer	185	200	11	330
Workstation/PC	330	400	18	900
Total	590	675	14	1,310

Exhibit IV-10

Turnkey Systems Market  
United Kingdom

	User Expenditures £ Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	640	680	7	970
Software and Other Changes	560	670	16	1,380
Total	1,200	1,350	12	2,350



## Exhibit IV-11

Leading Application Software Product Vendors  
United Kingdom

Rank	Vendor	Estimated Revenues 1990 (£ Millions)
1	IBM	35
2	Computer Associates	30
3 =	Microsoft	20
3 =	BIS	20
5	Lotus	18
6 =	ICL	15
6 =	WordPerfect	15
8 =	Kewill	12
8 =	Ashton-Tate	12
10	Autodesk	10

## Exhibit IV-12

Leading Turnkey Systems Vendors  
United Kingdom

Rank	Vendor	Estimated Revenues 1990 (£ Millions)
1	McDonnell Douglas	80
2	Prime	75
3	ICL	50
4 =	Hoskyns	35
4 =	Mannesmann Kienzle	35
6 =	Kalamazoo	30
6 =	Siemens Nixdorf	30
8	Intergraph	30
9	BIS	23
10 =	Unisys	22

**D**  
**Italy**

The market analysis and forecast for the Italian applications software product market is shown in Exhibit IV-13, and that for the Italian turnkey systems market in exhibit IV-14. The Italian market has a relatively low penetration for packaged applications solutions and generally demonstrates a preference for custom developed system. Generally turnkey systems need to be sold with a customised element to convince the client of the uniqueness of the offering.

The government is a key factor in the Italian market and wields considerable buying power with control over significant areas of industry and commerce, notably banking. This situation tends to favour larger software and services vendors with smaller vendors largely restricted to the private sector.

Leading competitors in the Italian applications solutions market are listed in Exhibits IV-15 and IV-16.

Major applications software vendors in Italy are Computer Associates (following absorption of Cullinet) and IBM. Olivetti is the only leading Italian software vendor with a presence outside Italy due to its equipment based activities. Most Italian owned applications vendors are relatively small and limited to niche sectors within their domestic market. These companies will face increasing competition as a single European market develops. In terms of industry opportunities, the restructuring of the manufacturing sector is likely to offer the best medium term prospects.

### Exhibit IV-13

#### Applications Software Products Market Italy .

	User Expenditures Lira Billions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	165	170	2	180
Minicomputer	420	470	14	900
Workstation/PC	760	930	19	2,200
Total	1,350	1,570	16	3,300

## Exhibit IV-14

Turnkey Systems Market  
Italy

	User Expenditures Lira Billions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	450	480	7	660
Software and Other Changes	400	470	15	940
Total	850	950	11	1,600



## Exhibit IV-15

Leading Application Software Product Vendors  
Italy

Rank	Vendor	Estimated Revenues 1990 (Lira Billions)
1	IBM	75
2	Lotus	40
3	Microsoft	30
4	Finsiel	25
5 =	Data Management	20
5 =	Olivetti	20
5 =	Systems & Management	20
8	WordPerfect	18
9 =	Computer Associates	15
9 =	Ashton Tate	15

## Exhibit IV-16

Leading Turnkey Systems Vendors  
Italy

Rank	Vendor	Estimated Revenues 1990 (Lira Billions)
1	Olivetti	65
2 =	Siemens Nixdorf	50
2 =	IBM	50
4	Sicit	35
5 =	Prime	30
5 =	Mannesmann Kienzle	30
5 =	Datamat	30
8	Hewlett Packard	22
9 =	Intergraph	20
9 =	Enidata	20

**E**  
**Spain**

The Spanish market, although still relatively small, is forecast to grow more rapidly than any other country over the next five years. Exhibits IV-17 and IV-18 provide the market analysis and forecast for the application product and turnkey systems respectively.

Without indigenous equipment vendors or major software services firms the Spanish market is not surprisingly dominated by foreign multinationals, primarily the major equipment vendors. Significant local applications solutions vendors include:

- Centro de Calculo
- Logic Control
- Ibermatica
- Central Informatica
- Asicom.

Considerable applications solutions business has been generated by a booming market for PCs and a relatively high level of merger and acquisition activity. Commercial restructuring drives the need for new application solutions. UNIX has a significant profile in Spain partly as a result of pressure from the Spanish government. It is estimated that approximately 60% of all new systems by installed value are UNIX based.

## Exhibit IV-17

Applications Software Products Market  
Spain

	User Expenditures Ptas Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	2,900	3,100	6	4,100
Minicomputer	7,700	9,200	19	22,000
Workstation/PC	13,700	17,400	26	55,000
Total	24,300	29,700	22	81,100

## Exhibit IV-18

Turnkey Systems Market  
Spain

	User Expenditures Ptas Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	21,000	24,000	14	46,000
Software and Other Changes	19,000	23,300	22	63,000
Total	40,000	47,300	18	109,000

## F Other European Countries

Market analysis and forecast data for the remaining European countries is provided in the following Exhibits:

- Sweden, Exhibits IV-19 and IV-20

### Exhibit IV-19

#### Applications Software Products Market Sweden

	User Expenditures SK Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	175	180	6	240
Minicomputer	400	480	18	1,100
Workstation/PC	790	1,000	25	3,000
Total	1,350	1,650	21	4,350

### Exhibit IV-20

#### Turnkey Systems Market Sweden

	User Expenditures SK Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	1,000	1,150	12	2,000
Software and Other Changes	950	1,100	22	2,950
Total	1,950	2,250	17	4,950



- Denmark Exhibits IV-21 and IV-22

## Exhibit IV-21

Applications Software Products Market  
Denmark

	User Expenditures DK Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	100	100	4	120
Minicomputer	350	400	14	770
Workstation/PC	600	700	19	1,700
Total	1,050	1,200	16	2,600

## Exhibit IV-22

Turnkey Systems Market  
Denmark

	User Expenditures DK Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	850	940	10	1,500
Software and Other Changes	750	890	19	2,100
Total	1,600	1,830	14	3,600

- Norway Exhibits IV-23 and IV-24

Exhibit IV-23

Applications Software Products Market  
Norway

	User Expenditures NK Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	110	115	5	150
Minicomputer	270	320	17	710
Workstation/PC	490	610	23	1,700
Total	850	1,050	19	2,550

Exhibit IV-24

Turnkey Systems Market  
Norway

	User Expenditures NK Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	640	720	14	1,400
Software and Other Changes	560	630	19	1,500
Total	1,200	1,350	17	2,900

- Finland Exhibits IV-25 and IV-26

### Exhibit IV-25

#### Applications Software Products Market Finland

	User Expenditures FM Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	70	75	4	90
Minicomputer	180	220	17	490
Workstation/PC	320	390	21	1,000
Total	570	685	18	1,580

### Exhibit IV-26

#### Turnkey Systems Market Finland

	User Expenditures FM Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	370	400	12	700
Software and Other Changes	340	400	18	900
Total	710	800	15	1,600

- Netherlands Exhibits IV-27 and IV-28

Exhibit IV-27

Applications Software Products Market  
Netherlands

	User Expenditures Dfl Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	100	100	4	125
Minicomputer	270	310	16	640
Workstation/PC	490	590	22	1,600
Total	860	1,000	19	2,370

Exhibit IV-28

Turnkey Systems Market  
Netherlands

	User Expenditures Dfl Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	410	470	14	920
Software and Other Changes	400	470	18	1,080
Total	810	940	16	2,000



- Belgium Exhibits IV-29 and IV-30

## Exhibit IV-29

Applications Software Products Market  
Belgium

	User Expenditures BF Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	1,050	1,100	6	1,450
Minicomputer	2,950	3,450	15	6,800
Workstation/PC	5,300	6,400	21	16,500
Total	9,300	11,000	18	24,800

## Exhibit IV-30

Turnkey Systems Market  
Belgium

	User Expenditures BF Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	3,950	4,400	11	7,300
Software and Other Changes	3,550	4,400	20	11,100
Total	7,500	8,800	16	18,400

- Switzerland Exhibits IV-31 and IV-32

**Exhibit IV-31**

**Applications Software Products Market  
Switzerland**

	User Expenditures SF Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	60	65	5	80
Minicomputer	95	110	17	240
Workstation/PC	165	200	22	530
Total	320	375	18	850

**Exhibit IV-32**

**Turnkey Systems Market  
Switzerland**

	User Expenditures SF Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	380	430	14	800
Software and Other Changes	330	380	19	900
Total	710	810	16	1,700

- Austria Exhibits IV-33 and IV-34

## Exhibit IV-33

Applications Software Products Market  
Austria

	User Expenditures Sch Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	165	175	6	230
Minicomputer	425	500	15	1,000
Workstation/PC	750	925	23	2,600
Total	1,340	1,600	19	3,850

## Exhibit IV-34

Turnkey Systems Market  
Austria

	User Expenditures Sch Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	1,450	1,600	12	2,800
Software and Other Changes	1,250	1,500	20	3,800
Total	2,700	3,100	16	6,600

- Rest of Europe IV-35 and IV-36

Exhibit IV-35

Applications Software Products Market  
Rest of Europe

	User Expenditures \$ Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Mainframe	6	7	7	10
Minicomputer	13	16	20	40
Workstation/PC	28	34	28	115
Total	47	57	24	165

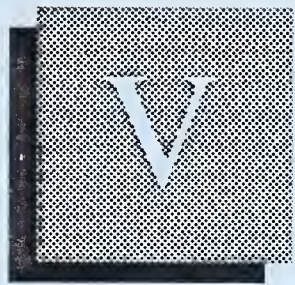
Exhibit IV-36

Turnkey Systems Market  
Rest of Europe

	User Expenditures \$ Millions			
Subsector	1990	1991	1991-1996 CAGR (Percent)	1996
Systems Equipment	55	63	16	130
Software and Other Changes	45	54	23	155
Total	100	117	19	285







# Vendor Issues

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## **V Vendor Issues**

### **A Introduction**

Some of the leading application solution vendors were asked to evaluate some of the industry trends which are widely believed to be taking place. The full list of possible trends is shown in Appendix A. Vendors were asked to rate the trends according to three criteria:

- to what extent the trend is taking place
- the impact of the trend on their business
- how favourable the trend is to their business.

The results of this survey are discussed in the following sections.

### **B Most Significant Trends**

The most significant industry trends affecting application solution vendors are listed in Exhibit V-1 in order of degree of significance.

As can be seen "information sharing across applications" was regarded by vendors to be the most significant trend occurring at the present time. Users are increasingly looking for better integration and data sharing between applications, and so vendors of application solutions are typically in the process of integrating their one-off applications into integrated product groups. This often involves underpinning the various application software products with a common relational database. For example, Pioneer Computer Systems, an application software product developer specialising in the process manufacturing sector has products, or access to products, for:

- production management
- supervisory control and data acquisition (SCADA)
- laboratory information management (LIMS)
- bar-code data collection.

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The company is developing facilities to link these applications into a common integrated business system for the process manufacturing sector. Of course this is a very similar endeavour to that of CINCOM - primarily targeted at the discrete manufacturing sector - with its CIM Alliance program, which seeks to offer an integrated discrete manufacturing business system by taking applications from a number of partners covering applications such as:

- computer aided design (CAD)
- process planning
- shopfloor data collection

and integrating them with its own products.

Related trends are the adoption of Unix by users and much greater use of networking. Open systems and Unix provide a common platform which facilitates the integration of applications, while networking is often the mechanism for both information sharing across applications and information sharing across workgroups. As users move to flatter organisational structures, the sharing of common data between departments and functions is rising in importance.

Finally the use of graphical user interfaces is seen as an important trend by vendors. This trend no longer applies solely to vendors of personal computer software but is also being adopted by vendors who traditionally targeted mainframes and minicomputers. Of course these vendors are now often launching Unix versions of their application software products.

#### **Exhibit V-1**

##### **Most Significant Industry Trends Application Solution Vendors, Western Europe**

- Information Sharing across applications
- Adoption of Unix
- Greater Use of Networking
- Graphical User Interfaces
- Information Sharing Across Workgroups

## **C**

### **Trends with Most Significant Impact**

The trends identified by application solution vendors as having the most impact on their businesses are shown in Exhibit V-2.

The vendors who replied to the questionnaire have all been active in the applications solutions market for some years and accordingly have developed individual applications on proprietary equipment. As a result each vendor has had to redevelop its products to run in a Unix environment, and was now having to consider the use of graphical user interfaces and improved integration of application software products into compatible families. Each of these activities is potentially very expensive in terms of software development resources.

#### **Exhibit V-2**

#### **Industry Trends with High Impact on Vendors Application Solutions, Western Europe**

- Adoption of Unix
- Information Sharing across Applications
- Graphical User Interface
- Greater end user control of purchasing

## **D**

### **Favourable & Unfavourable Trends**

The trends which application solutions vendors regarded as most favourable to their organisations are listed in Exhibit V-3 while the trends vendors regarded as least favourable are listed in Exhibit V-4.

Integration of applications is regarded as a desirable trend by vendors since it assists vendors in selling a complete business solution. In-house development of applications is still seen as the major competitive threat by many applications solutions vendors and any factors which add to system complexity and make it difficult for users to do their own developments are viewed in a positive light by vendors. Greater integration of applications is believed to act as a deterrent to users carrying out application development in-house.

A requirement for a range of integrated application solutions also facilitates sales for vendors who have adopted this approach, and so tends to favour the larger applications solutions vendors.

The trend towards "greater end user control of purchasing" is also seen as a particularly favourable trend by application solution vendors. Firstly, end users are more likely to purchase a standard application solution than the in-house IS department. Secondly, end users are perceived to be more sophisticated purchasers who are capable of understanding and appreciating the high levels of functionality which vendors incorporate into their products.

### **Exhibit V-3**

#### **Most Favourable Industry Trends Applications Solutions Vendors, Western Europe**

- Information Sharing Across Applications
- Greater End User Control of Purchasing
- Greater Use of Networking
- Graphical User Interfaces
- Adoption of Unix

Many vendors have now adopted, or have under development, versions of products which run under Unix, and make greater use of networking and graphical user interfaces. Accordingly these vendors were in favour of these developments.

However there were also concerns expressed by application solution vendors concerning users' adoption of Unix.

One of these, shown in Exhibit V-4, is the concern with changing software product distribution channels. A number of vendors are concerned that they will need to adopt alternative sales channels from their traditional direct sales forces, and so will lose some channel control. Another fear expressed was that Unix will lead to cut-throat price competition for application solutions.

**Exhibit V-4****Least Favourable Industry Trends  
Applications Solutions, Vendors,  
Western Europe**

- User Downsizing
- Higher levels of outsourcing
- Changing software product distribution channels

Outsourcing was not perceived to be a particularly positive trend by applications solutions vendors. Again there is the danger with systems operations that vendors will tend to lose contact and influence with users. A similar fear was expressed for systems integration where it was felt that over-zealous project leaders might try to mix and match applications from a number of sources rather than purchase the set of integrated applications software products available from a single application solutions vendor.

Overall, there is a significant level of concern about the possible implications of downsizing from many applications solutions vendors who have traditionally operated in either mainframe or minicomputer environments. Many vendors such as SAP who have traditionally specialised in mainframe-based application solutions, are now launching Unix-based products.

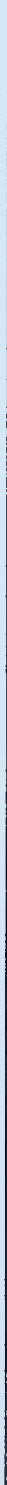
SAP's new R/3 product will run under a number of Unix implementations and will feature client/server and object-oriented technology. However there is also concern from the traditional microcomputer-based application solution vendors about users migrating to PC-lan based solutions.







## Vendor Profiles





## VI Vendor Profiles

### A SAP

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#### SAP AG

Max-Planck Strasse 8  
D-6909 Walldorf  
Germany  
Tel: 49 62 27 34 0  
Fax: 49 62 27 34 12 82

Chairman: Dietmar Hopp  
Status: Private  
Number of Employees: 2,000  
Revenue (FYE 31-12-90): DM 499 million

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#### The Company

SAP was founded in 1972 by its four directors and major shareholders (80% ownership):

Dietmar Hopp  
Dr Hasso Plattner  
Hans Werner Hector  
Klaus Tschira

The company established itself during the 1980s as the most successful European application software products vendor with its dominance of the German market for accounting applications based on mainframe architectures. The company's R/2 product covers:

- Financial accounting
- Fixed assets accounting
- Production management
- Cost accounting
- Plant maintenance
- Human resource management

However, although still a very successful company, SAP, during the early 1990's faces those challenges characteristic of the European application software products sector.

Specifically the company's challenges are to:

- expand its international coverage
- exploit any opportunities emerging in Eastern Europe
- introduce new product ranges offering greater portability and designed for distributed computing
- extend its market coverage to small and medium-sized organisations
- retain its traditional customer base in the face of rapidly changing technology.

### **Product/Market Strategy**

Accordingly SAP has established plans to target separately the following two market segments:

- Large firms: typically with turnovers greater than DM150 million and using mainframes.
- Medium-sized firms: typically with turnovers between DM30 million and DM150 million and utilising AS/400, Siemens BS2000 or Unix-based systems

Subsequently SAP will address the small company segment where Unix and OS/2 are the appropriate software environments.

For the large company market, SAP will continue to supply its R/2 product. However a version of the new product R/3 will be available on mainframes - SAP supports IBM and Siemens mainframes - as a possible replacement for R/2 from 1994 onwards. Enhancements to the R/3 product are likely to cease in 1995.

SAP's strategy in the medium-sized company market has been:

- acquisition of a client base
- acquisition of AS/400 based application software products
- development of a new mid-range product R/3.

To accelerate penetration of the medium-sized company market, SAP took over the Steeb group in Abstatt and CAS GmbH in Weinstadt in 1990. These firms are both successful suppliers of standard application software running on AS/400 equipment to medium-sized companies. Steeb's speciality is accounting, while CAS has made its name with logistics solutions. The two systems have now been combined and are being actively marketed. Between them, Steeb and CAS have about 500 customers. Steeb and CAS have been merged to form the SAP medium-sized customer organisation, to which SAP CONSULTING will also contribute its know-how. SAP CONSULTING will be integrated into the medium-sized customer organisation at a later date.

The SAP medium-sized customer organisation has about 300 personnel and is internationally oriented.

Like users of SAP's R/2 software, Steeb/CAS customers will be offered transfer systems permitting migration to the R/3 System. The SAP Group's medium-sized customer organisation already services 600 customers with sales in the DM 30-150 million range.

### The R/3 Product

Recognising the lack of growth in the mainframe sector and the need for products incorporating Window-based user interfaces, distributed processing, and networked systems with standardised data communication, SAP has spent extensively on R&D - 22% of sales income in 1990, for example - and developed its successor to the R/2 product, called R/3.

R/3 is an advanced product utilising:

- client/server architecture
- object-oriented development
- graphical user interfaces.

It will be available on Unix-based equipment from IBM, Siemens, Digital, Hewlett-Packard, and Bull. Beta testing is already underway at pilot sites and the product will be launched in January 1992.

As well as Unix-based equipment, R/3 will be made available on IBM AS/400 and Siemens BS2000 equipment.

### Exhibit VI-1

SAP PRODUCT SCHEDULE

	1991	1992	1993	1994	1995
Mainframe	R/2	R/2	R/2	R/2 R/3	R/2 R/3
AS/400	SC400	SC400 R/3*	SC400 R/3	R/3	R/3
Siemens BS2000	R/2	R/2 R/3*	R/2 R/3	R/3	R/3
Unix		R/3	R/3	R/3	R/3

Note: \* introduction planned for mid year



## Subsidiaries

### Exhibit VI-2

#### SUBSIDIARIES

COMPANY	COUNTRY	PERCENT SHARE OWNERSHIP	NUMBER OF EMPLOYEES
SAP Consulting	Germany	50	66
TOS GmbH	Germany	60	59
Steeb Informationstechnik GmbH	Germany	50	158
CAS GmbH	Germany	76	58
SRS Software und Systemhaus Dresden GmbH	Germany	45	302

## Geographic Coverage

### Exhibit VI-3

#### 1990 MARKET ANALYSIS BY COUNTRY (DM MILLIONS)

COUNTRY	REVENUE	PERCENT
Germany	290	58
Austria	22	4
Switzerland	17	3
France	21	4
Netherlands	19	4
Denmark	9	2
U.K.	16	3
Italy	5	1
Spain	9	2
Sweden	7	1
Belgium	8	2
Australia	14	3
USA/Canada	32	6
Singapore/Asia	11	2
Others	18	5
<b>TOTAL</b>	<b>499</b>	<b>100</b>

In 1990 SAP's international sales grew faster than domestic sales; sales of SAP International AG amounted to 42% of the Group total in 1990. Worldwide, at the end of the 1990 financial year, 473 people were employed at SAP International's headquarters in Biel and the national subsidiaries.

SAP has set up national subsidiaries and invested heavily in the training of qualified personnel in countries with SAP branch offices. In the international marketplace as in the domestic one, SAP prefers a consultancy-style approach to sales emphasising knowledge rather than sales technique. Using parent company/subsidiary links between customers already using SAP software, reference customers were quickly gained, which then acted as models for other businesses operating in the same country.

In the meantime, all the country-specific requirements - some of which had previously been handled by the national subsidiaries as supplements to the system - have been incorporated into the standard product. Firms with affiliates in different countries can now use identical versions of SAP standard software at a central computer centre or on individual computer systems. There are country-specific extensions for the following countries:

Australia	The Netherlands
Austria	Norway
Belgium	Spain
Canada	Sweden
Denmark	Switzerland
France	United Kingdom
Italy	United States

## Exhibit VI-4

## SAP INSTALLED BASE APRIL 1, 1991

COUNTRY	NUMBER OF CUSTOMERS
Germany	966
Austria	103
Switzerland	88
Netherlands	47
France	41
United Kingdom	25
Spain	24
Italy	20
Belgium	19
Denmark	16
Norway	7
Sweden	7
Luxembourg	3
Hungary	2
Liechtenstein	2
United States	26
Australia	16
Canada	7
Other	19
<b>TOTAL</b>	<b>1438</b>

SAP software is available in:

German  
English  
French  
Spanish  
Italian  
Dutch  
Danish  
Swedish  
Russian.

By using SAP's data dictionary, users can switch between languages in the same session.

Exhibit VI-5

NUMBER OF EMPLOYEES, 1990	
COUNTRY	NUMBER OF EMPLOYEES
Germany	1737*
Switzerland	80
France	39
Austria	30
Netherlands	27
United Kingdom	25
Spain	24
Denmark	23
Italy	19
Sweden	14
Belgium	12
U.S.	68
Canada	15
Australia	17
Singapore	8
TOTAL	2138

Note: \* Includes 72 in SAP International serving markets outside Germany.

SAP will continue to place a high priority on expanding its international coverage.

Expansion into Eastern Europe

SAP moved into the market in Eastern Germany promptly. At the beginning of 1991, SAP's branch office in Berlin had 67 employees, while over 300 personnel were employed at SRS in Dresden.

SRS, based in Dresden, is a joint venture between SAP, Robotron, and Siemens. One of its main functions is to market and implement the SAP System on Siemens computers. SAP has a 45% stake in SRS.

In 1990, SAP gained more than 60 customers in Eastern Germany, but these have yet to have an effect on sales revenue. This new market can be expected to expand fast, especially now that SAP has a large number of experienced personnel at its disposal in Berlin and Dresden. SAP is anticipating substantial sales to these new customers.

Another important task being handled by SRS is the preparation of SAP software for use in the USSR and, medium-term, in the other former Eastern bloc countries. With Robotron, SAP has gained a useful partner which is contributing the necessary infrastructure and qualified personnel to the joint venture.



The former Eastern bloc countries will contribute to an expansion of the international market in the medium term - and, from the point of view of their economic power, in the long term too. SAP's Austrian subsidiary is already serving companies in Hungary. With the assistance of the Soviet software house ZPS, Zentr-Programmsystem, based in Tver, SAP's products are now being adapted for installation in the Soviet Union.

ZPS was introduced as SAP's partner at CeBIT'91, the German information technology fair, where parts of the Russian language user interface for the R/2 System were demonstrated.

## Market Analysis

### Exhibit VI-6

1990 MARKET ANALYSIS BY DELIVERY MODE  
(DM MILLIONS)  
WESTERN EUROPE

DELIVERY MODE	REVENUE	PERCENT
Software Products	260	60
Professional Services		
Training	60	14
Consultancy	100	23
Turnkey Systems	5	1
Other	5	1
<b>TOTAL</b>	<b>430</b>	<b>100</b>

SAP CONSULTING serves medium-sized companies which run SAP standard software on high-performance, inexpensive Siemens or IBM small systems computers, based on the BS2000 or DOS/VSE operating systems. The whole range of R/2 System applications, including all the accounting, logistics, and human resources management modules, is available to these customers without any restrictions on functionality.

The aim is for this software to be used without modification. SAP CONSULTING offers a control system for computer centers which it has developed itself and which allows day-to-day operations without any detailed knowledge of operating systems. Active consulting support is provided and the selected modules tailored to customers' needs on site.

TOS, Gesellschaft für Technologie, Organisation und Softwareentwicklung mbH located in Freiberg deals mostly with customers wanting to supplement their SAP software with customised programs which need to be integrated as far as possible into the standard products used.

TOS employs 62 people and has a branch office in Düsseldorf.



Financial Information

Exhibit VI-7

FIVE-YEAR FINANCIAL SUMMARY (FYE 31-12) (DM MILLIONS)

YEAR	1986	1987	1988	1989	1990
Revenues	102	152	245	367	499
Annual Growth Rate		49%	61%	50%	36%
Profit after Taxes	22.9	31.6	44.5	68.2	82.1
% Profit	22%	21%	18%	18%	16%
Annual Growth Rate Per Cent		38	41	53	20

## B Dun & Bradstreet Software

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### DUN & BRADSTREET SOFTWARE

3445 Peachtree Road  
NE Atlanta  
GA 30326  
United States  
Tel: 1 404 239 2000

Chairman: John Imlay  
Status: Subsidiary  
Revenues: \$539 million

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### The Company

Dun & Bradstreet Software is the major subsidiary within the Software Services division of the Dun & Bradstreet Corporation. The complete list of subsidiaries within this division is as follows:

- *Dun & Bradstreet Software* produces and markets financial, human-resource, materials-management, manufacturing and higher-education applications software worldwide for mainframe, mid-range and personal computers. It also provides customers with a variety of maintenance services.
- *Sales Technologies* provides sales-force-management software and services in the U.S. and Europe.
- *Compumark* markets field sales-force information, lead-tracking and marketing-database systems.
- *Erisco* provides employee-benefits-administration software and services.

Dun & Bradstreet Software was formed at the start of 1990 by merging McCormack & Dodge (M&D) - acquired in 1983 and Management Science America (MSA), which was acquired at year-end 1989.

McCormack & Dodge and MSA were two of the markets leaders in providing accounting systems on IBM mainframes throughout the 1970s and 1980s.

D&B Software successfully integrated the operations of M&D and MSA during the year and reported solid growth in revenue and operating income, compared with the combined results of the two companies in 1989. Recurring maintenance services generated almost half of D&B Software's revenue in 1990, which is well above industry levels.

Key Products and Services

Dun & Bradstreet Software specialises in application software products covering:

- accounting
- human resource management
- production management

The company serves more than 10,000 customers worldwide, including 75 percent of the *Fortune* 500 companies. Its software runs on hardware that includes IBM, Digital Equipment Corporation, Fujitsu, Tandem and ICL, though the traditional emphasis has been on IBM mainframe-based solutions.

Exhibit VI-8

MAJOR APPLICATION SOFTWARE PRODUCTS

APPLICATION	ENVIRONMENT	NUMBER INSTALLED
General Ledger	IBM mainframe, Digital Vax	5,950
Accounts Payable	IBM mainframe, Digital Vax	3,600
Purchasing System	IBM mainframe, Digital Vax	1,300
Accounts Receivable	IBM mainframe, Digital Vax	1,350
Fixed Assets	IBM mainframe, Digital Vax	3,000
Personnel/payroll	IBM mainframe	2,850
MRPII	IBM mainframe, AS/400, HP3000	1,000
DRP	IBM mainframe	100
Factory Control & Management	Tandem	New Product
Finite scheduling	Digital Vax	New Product

In 1990, D&B Software introduced a Factory Control and Management System that regulates the manufacturing process; relational human-resource payroll and personnel packages that provide customers with easy access to human-resource information; a workstation development tool that allows customers to create applications for mainframe and personal computers; and four financial applications for Digital Equipment Corporation VAX computers.

In 1990, the division developed a strategy to guide the development of products and services that will meet short- and long-term customer needs. D&B Software will invest its resources in specific key areas. Current product enhancements will focus on increasing the value of existing software for customers in terms of productivity and functionality. Value-added offerings will more fully utilise leading-edge technologies and strategic hardware platforms. These will be a foundation for future architectures, which will encompass open systems and provide consistent global functionality for future products. Service will be expanded to include the support, consulting, education and documentation products needed to help customers fully leverage their investment in current products and future technologies.

In future Dun & Bradstreet Software will concentrate on developing applications to run under SAA and Unix client/server environments.

The company's general ledger product now runs using DB2 and versions of its other products - such as human resources applications - are being developed to take advantage of DB2. However, for the longer term, Dun & Bradstreet Software is committed to investing heavily in applications for the client/server environment.

#### Exhibit VI-9

##### WESTERN EUROPE, SOFTWARE AND SERVICES, 1990 ESTIMATED BREAKDOWN BY INDUSTRY

SECTOR	REVENUES (\$ MILLIONS)	PERCENT
Banking & Finance	7	8
Insurance	4	5
Manufacturing	33	40
Distribution, transportation, Utilities	28	35
Government and Public Sector	10	12
<b>TOTAL</b>	<b>82</b>	<b>100</b>



**Exhibit VI-10****EUROPEAN SOFTWARE & SERVICES, 1990  
ESTIMATED BREAKDOWN BY DELIVERY MODE**

DELIVERY MODE	REVENUES (\$ MILLIONS)	PERCENT
Application Software products	70	90
Professional Services	12	10
<b>TOTAL</b>	<b>82</b>	<b>100</b>

More than seventy percent of Dun & Bradstreet Software's revenues arise from existing customers purchasing additional software and services, and roughly fifty percent of revenues arise from software maintenance.

The client base covers sixty countries. In Italy, Dun & Bradstreet Software Italia has recently entered into a joint-venture agreement with Logica General Systems - creating LGS Soluzioni Gestionali. Based in Milan, the new company will drive management solutions throughout the Italian market.

With a combined client base of more than 150 installations, LGS Soluzioni Gestionali offers all Dun & Bradstreet Software products in addition to a locally developed information management system for receivables and payables called Clienti Fornitori (CLIFO) that was designed specifically for the Italian marketplace.

**Financial Information**

The European revenues of Dun & Bradstreet Software were valued at \$82 million in 1990.

Exhibit D shows the financial summary for the Software Services Division as a whole. Accordingly this includes revenues for:

- Sales Technologies
- Compumark
- Erisco

However the "overwhelming" majority of these revenues are accounted for by Dun & Bradstreet Software. The 130% growth in revenues in 1990 reflects the acquisition of MSA, organic growth being 10.3%.

In the immediate future, Dun & Bradstreet Software is looking for revenue growth above 10 percent and a significant improvement in profit margins as a result of cost saving arising from the integration of M&D and MSA.



## Exhibit VI-11

## FIVE YEAR FINANCIAL SUMMARY (\$ MILLIONS) D&amp;B SOFTWARE SERVICES

	1986	1987	1988	1989	1990
Revenues	154	175	201	233	539
Annual Growth Rate (%)	-	14	15	16	131
Operating Income	9	7	13	35	41
Annual Growth Rate (%)	-	(22)	86	169	17

C

Quality Software Products

**QUALITY SOFTWARE  
PRODUCTS LTD**  
Talipot House  
5th Avenue Business Park  
Team Valley  
Gateshead NE11 0XA  
United Kingdom  
Tel: 091 491 0670

Chairman: Alan Mordain MBE  
Managing Director: Roy Stoves  
Status: Private  
Number of employees: 200  
Revenue: (FYE 31-12-90) £ 7.5 million

The Company

Quality Software Products (QSP) was founded in 1981 by Alan Mordain who identified a gap in the market for accounting systems operating in a real-time environment, and using database technology.

Accordingly along with vendors such as Walker Interactive, the company was one of the pioneers in introducing real-time, integrated accounting software into the UK, overtaking the technology used by vendors such as MSA and McCormack & Dodge at that time.

QSP signed a strategic joint marketing agreement for its OLAS systems with IBM UK in 1989, the latter taking a 10% shareholding in the company.

Exhibit VI-12

SHAREHOLDERS	
SHAREHOLDER	PERCENT OWNED
Directors and staff	69
3i	17
IBM	10
Advent	4

## Exhibit VI-13

## KEY PERSONNEL

NAME	ROLE
John Parker	Marketing Director
Mike Starkings	Sales Director
Alan Gray	Client Services Director
Mike Hay	Technical Director
Mike McManus	Finance Director

## Key Products &amp; Services

QSP provides high quality management information and accounting systems to major organisations in industry, commerce and the public sector. Its OLAS Real-Time Integrated Systems are in use in over 100 organisations, such as

Nottinghamshire County Council  
 Bayer UK  
 J. Lyons & Co  
 The Wrigley Company  
 British Shoe Corporation Ltd  
 J. Henry Schroder Wagg & Co  
 Iveco Ford Truck Ltd  
 East Midlands Electricity  
 Patons & Baldwins  
 Siemens plc  
 Lloyds Bank  
 British Airways  
 Bank of England  
 Legal & General  
 Rank Xerox.

OLAS is marketed in the UK as an IBM-recommended system on S/370 architecture, and covers:

General ledger  
 Purchase ledger  
 Sales ledger  
 Purchase Order Processing  
 Commitment Accounting  
 Inventory Management  
 Fixed Assets  
 Project Tracking  
 Report Writing.

OLAS is a full multi-currency accounting system, maintaining multiple currency balances within any account in any ledger. OLAS handles any number of currencies and exchange rates for different purposes, and you can revalue ledgers or parts thereof in conformance with UK, European and US Accounting Standards. Foreign currency payments, receipts and Bills of Exchange are handled effectively, and OLAS accounts for realised and unrealised exchange differences. Full currency exposure forecasts are also available.

Until now OLAS has only been available to run on IBM mainframe architecture and a DB2 version of the product has recently been released. However QSP, like many of the software product vendors who traditionally operated in the IBM mainframe sector (for example, SAP) has recognised the importance of downsizing its product if it is to achieve significant market growth. Accordingly, QSP's next release is scheduled for 1992 with its UNIVERSAL OLAS system capable of operating on IBM mainframe, AS/400, PS/2 and UNIX hardware.

Market Analysis

Exhibit VI-14

1990 REVENUES BY COUNTRY (£ MILLIONS)

COUNTRY	REVENUES	PERCENT
United Kingdom	6.7	90
Australia	0.8	10
TOTAL	7.5	100

Exhibit VI-15

1990 MARKET ANALYSIS BY DELIVERY MODE  
(£ MILLIONS)  
WESTERN EUROPE, SOFTWARE & SERVICES

DELIVERY MODE	REVENUE	PERCENT
Application Software Products	4.0	60
Professional Services	2.7	40
TOTAL	6.7	100

## Exhibit VI-16

## FINANCIAL SUMMARY (£ MILLIONS) (FYE 31-12)

	1989	1990
Revenues	6.2	7.5
Annual Growth Rate (%)	-	21
Profit before taxes	0.4	1.0
Annual Growth Rate (%)	-	150
Profit after taxes	0.5	1.0
Annual Growth Rate (%)	-	100



## **D** **Intergraph**

### **INTERGRAPH EUROPE, INC.** **(European Headquarters)**

Hoofddorp  
The Netherlands  
Tel: 31 2503 66 333  
Fax: 31 2503 66 414

Vice President: Manfred Wittler  
Status: Subsidiary  
Number of Employees: 1,682 (Europe)  
Revenue (FYE 31-12-90): \$ 344.81 million  
(Europe)

### **INTERGRAPH CORPORATION** **Corporate Headquarters**

Huntsville  
Alabama 35894-0001  
U.S.A.  
Tel: (205) 730 2000  
Fax: (205) 730 2461

President: Elliott D. James  
Chairman and CEO: Jim Meadlock  
Status: Public (OTC NASDAQ)  
Number of Employees: 9,600, worldwide  
Revenue (FYE 31.12.90): \$1,045 million,  
worldwide

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## **The Company**

Intergraph Corporation of the U.S. was incorporated in 1969 as M&S Computing Inc.; it designs, manufactures, markets and supports interactive computer graphics systems, including hardware and application software. Intergraph Europe, Inc. in the Netherlands is the European headquarters.

Intergraph is represented in Europe through subsidiaries in Austria, Belgium, Denmark, Finland, France, Germany, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the U.K.

Intergraph has offices in the U.S., Canada, Asia and the Middle East.

Worldwide revenues in 1990 were \$ 1,045 million and European revenues were \$ 344.8 million.

As of December 1990, Intergraph employed 1,682 staff in Europe.

### Exhibit VI-17

1990 EMPLOYEE CHART BY EUROPEAN COUNTRIES

COUNTRY	NUMBER OF EMPLOYEES
Austria	11
Belgium	25
Denmark	30
Finland	42
France	176
Germany	317
Italy	87
The Netherlands	410
Norway	35
Portugal	19
Spain	94
Sweden	87
Switzerland	47
The U.K.	302
<b>TOTAL</b>	<b>1,682</b>

### Key Products and Services

The major markets addressed by Intergraph are:

- Electronics
- Electromechanical design
- Mechanical design, engineering, and manufacturing
- Architecture, engineering and construction
- Mapping and geographic information systems
- Utilities
- Electronic publishing

In December 1990, Intergraph considerably expanded its presence in electronics design automation, with the acquisition of Daisy/Cadnetix Inc. (Dazix). Intergraph's existing electronic design group has been merged with Dazix to form a new independent operating unit. Following this merger Dazix has announced its Simultaneous Engineering Environment (SEE) - based on Intergraph's Technical Information Management system for mechanical design - offering tight integration of electronic design, electronic simulation, mechanical design, and manufacturing.

Two new markets being developed by Intergraph since 1990 are:

- Despatch management systems
- Technical information management

**Exhibit VI-18**

Equipment Base	Proportion of Revenues (%)	
	1989	1990
PC	18	20
Workstation	63	75
Digital Vax	19	5

Exhibit B illustrates the rapidly changing profiles of the equipment platforms on which Intergraph's turnkey systems and application software products are based. The CAD market was once totally dominated by turnkey suppliers selling their own high-performance equipment. The market is also moving rapidly away from mainframes and minicomputers to workstations and personal computers. In 1990, Sales of MicroStation software - available on PCs, Apple Macintosh, and Intergraph Unix workstations - increased substantially and are expected to increase further as a proportion of revenues during 1991. Also in September 1990, Intergraph introduced Series 2000, a new workstation to compete at the low end of the marketplace.

The CAD vendors such as Intergraph were one of the first groups of vendors to adopt open systems and Unix. Intergraph's operating system is based on Unix System V, while the application software uses an icon-driven user interface and provides database independence through a common interface to Ingres, Informix, Oracle, and DB2 relational database management systems.

However, there are signs that Intergraph is now starting to move away from its own proprietary Clipper equipment architecture, and is intending to point its mechanical software line to a

Sparc-based platform. At first this may be to an Intergraph Sparc clone to provide more sophisticated graphics than would be currently possible with standard Sun equipment.

## Market Analysis

### Exhibit VI-19

#### 1990 MARKET ANALYSIS - INTERGRAPH CLASSIFICATION

	1990 Revenues (\$ Millions)	Per Cent
Systems770	74	
Services275	26	
<b>TOTAL</b>	<b>1045</b>	<b>100</b>

### Exhibit VI-20

#### 1990 MARKET ANALYSIS BY DELIVERY MODE SOFTWARE & SERVICES REVENUES, WESTERN EUROPE

Delivery Mode	Revenues \$ Millions	Per Cent
Turnkey Systems	260	75
Application software products	65	19
Customer Services	20	6
<b>TOTAL</b>	<b>345</b>	<b>100</b>

The proportion of Intergraph's revenues derived from application software products rather than turnkey systems is expected to increase over the next few years as PC-based/CAD software increases its share of the market still further. This trend will accelerate further if Intergraph also starts to reduce its dependence on proprietary workstations in favour of standard Sun equipment.

**Exhibit VI-21****1990 MARKET ANALYSIS BY GEOGRAPHIC AREA  
(\$ MILLIONS)**

GEOGRAPHIC AREA	REVENUE	PERCENT
U.S.	553.9	53
Europe	344.8	33
Other	146.3	14
<b>TOTAL</b>	<b>1,045</b>	<b>100</b>

**Exhibit VI-22****1990 MARKET ANALYSIS BY COUNTRY  
SOFTWARE AND SERVICES REVENUES, WESTERN EUROPE**

Country	Revenues (\$ Millions)	Per Cent
Germany	100	31
United Kingdom	65	20
France	40	12
Netherlands	20	6
Spain	20	6
Italy	20	6
Sweden	20	6
Switzerland	10	3
Norway	8	2
Finland	8	2
Denmark	5	2
Belgium	5	2
Austria	2	1
Portugal	2	1
<b>TOTAL</b>	<b>325</b>	<b>100</b>

Note: Input estimates

As in 1989, Germany was the largest contributor to European 1990 revenues and further growth is expected in 1991.

In southern Europe, Intergraph made progress in selling systems to the mould-making industry, notably in Italy, Spain and Portugal.

Norway led the Nordic region with a 32% increase in revenues.



## Financial Information

## Exhibit VI-23

FIVE-YEAR FINANCIAL SUMMARY FOR INTERGRAPH CORPORATION  
(\$ MILLIONS) (FYE 31-12)

YEAR	1986	1987	1988	1989	1990
Revenue	605.7	641.1	800.1	860.0	1,045.0
Annual Growth Rate (%)	15	6	25	7	22
Profit before Taxes	123.5	115.8	138.8	119.3	98.3
Annual Growth Rate (%)	4	-6	20	-14	-18
Profit after Taxes	70.4	69.9	88.0	79.5	62.6
Annual Growth Rate (%)	4	-1	26	-1	-21
EPS (\$)	1.26	1.23	1.55	1.48	1.28

**E****Siemens Nixdorf Informationssysteme****SIEMENS NIXDORF  
INFORMATIONSSYSTEME AG**

Otto-Hahn-Ring 6  
8000 München 83  
Germany  
Tel: 49 89 6 36-0

Chairman: Dr. Hans-Dieter Wiedig  
Status: Subsidiary  
Number of employees: 50,000

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**The Company**

In April 1990, Siemens acquired a majority of the common stock of Nixdorf Computer AG and began the merger of its Data and Information Systems Group into its acquisition. On October 1st, 1990 this new unit was renamed Siemens Nixdorf Informationssysteme AG, in which Siemens has a 78% stockholding. Since Siemens Nixdorf Informationssysteme (SNI) is still in its first year of trading, much of this profile will consider the constituent parts from which the company was formed with the emphasis on the activities of Nixdorf Computer AG.

In its first year of trading, SNI is anticipating total revenue in the region of DM 13 million. In 1990 Siemens' Data and Information Systems Group had revenues of DM 7.7 billion and for the nine months to end September 1990 Nixdorf Computer had revenues of DM 3.4 billion.

**Key Products and Services**

Siemens' Data and Information Systems Group manufactures BS2000 proprietary general purpose computers, Sinix Unix-based computers, and personal computers. The company claims to be the largest supplier of Unix multi-user systems in Western Europe.

Nixdorf Computer had traditionally concentrated on offering turnkey systems based on its proprietary range of equipment particularly to small and medium-sized businesses. Much of the application software was based around its COMET range, which evolved from accounting software into a wide range of industry-specific applications.

However in the small-to-medium business market, Nixdorf had recently come under considerable pressure from competitors offering Unix and PC-based systems. As a result, Nixdorf has recently had to focus its attention on a narrower range of market sectors.

In 1990, Nixdorf remained strong in POS systems for the financial and retail sectors. Thirty per cent of Nixdorf's revenues in 1990 came from the financial sector.

For the retail sector, Nixdorf offers

- integrated merchandise management systems
- automated self-service machines to enable customers to scan their own purchases.

Other sectors where Nixdorf was successful in 1990 include:

- petrol service stations
- post offices
- hotels
- labour exchanges.

New run-time environments have also been developed to enable COMET software to be run under the Unix operating system.

One of the key areas in Nixdorf R&D is the ongoing development of software tools. Siemens' Data and Information Systems Group has also been putting increasing R&D effort into software development, including considerable investments in application software.

One of the aims of SNI will clearly be to be a market leader in the supply of Unix-based turnkey systems.

## Market Analysis

### Exhibit VI-24

FIVE YEAR FINANCIAL SUMMARY FOR NIXDORF AG  
(FYE 31-12) CONSOLIDATED FIGURES, DM MILLIONS

YEAR	1986	1987	1988	1989	SEPT 30 1990
Revenue	4,503	5,071	5,347	5,261	3,428
Annual Growth Rate (%)	-	13	5	(2)	(13)*
Profit before tax	308	331	(60)	(849)	(795)
Annual Growth Rate (%)	-	7	(118)	(1,351)	6
Profit after tax	222	264	26	(1,069)	(800)
Annual Growth Rate (%)	-	19	(90)	(4,212)	25

\* Assumes pro rata contribution to revenues in 4th quarter.

Exhibit VI-25

SIEMENS NIXDORF INFORMATIONSSYSTEME  
1990 MARKET ANALYSIS BY DELIVERY MODE  
(\$ MILLIONS) INPUT ESTIMATE

DELIVERY MODE	REVENUE	PERCENT
Software Products	500	30
Professional Services	100	6
Systems Integration	100	6
Turnkey Systems	1,000	58
TOTAL	1,700	100

Exhibit VI-26

SIEMENS NIXDORF INFORMATIONSSYSTEME  
1990 MARKET ANALYSIS BY COUNTRY  
WESTERN EUROPE (\$ MILLIONS) INPUT ESTIMATE

COUNTRY	REVENUE	PERCENT
Germany	1,050	62
France	130	8
Spain	120	7
UK	110	6
Italy	70	4
Netherlands	40	2
Switzerland	40	2
Austria	40	2
Other	100	7
TOTAL	1,700	100





# Appendices



A     **Forecast Reconciliation, 1990-1991**

Exhibit A-1 shows the changes made in this year's forecast in comparison to that of the previous year.

The change in the size of the market for the base year of 1990 is largely accounted for by the differing exchange rates of European currencies against the US dollar used in the two forecasts.

The changed exchange rates produce apparent increases in the market sizes of 11 per cent for application software products, and 13 per cent for turnkey systems in 1990.

However the growth rates over the forecast period have been revised downwards appreciably. This reflects both the lower rates of inflation now forecast throughout Western Europe and the difficult economic conditions which now prevail in many countries.

**Exhibit A-1**  
**Applications Solutions**  
**Reconciliation of Market Forecast**  
**Western Europe**

	1990 Market			1995 Market			1990-1995 CAGR Forecast in 1990 (Percent)	1991-1996 CAGR Forecast in 1991 (Percent)
Subsector	1990 Report (\$ Millions)	1991 Report (\$ Millions)	Variance (Percent)	1990 Report (\$ Millions)	1991 Report (\$ Millions)	Variance (Percent)		
Applications Software Products	6,885	7,600	+ 10	19,400	17,400	-10	23	18
Turnkey Systems	9,670	10,800	+ 12	22,700	21,400	-6	18	15







